



# Math-Magic




Textbook in Mathematics for Class I




S.C.E.R.T., W.B.  
N.C.F., '2005

Text book  
Code no. 001



# Math-Magic



Textbook in Mathematics for Class I



राष्ट्रीय शैक्षिक अनुसंधान और प्रशिक्षण परिषद्  
NATIONAL COUNCIL OF EDUCATIONAL RESEARCH AND TRAINING



ISBN 81-7450-476-1

**First Edition**

February 2006 Phalgun 1927

**PD 370T SU**

**© National Council of Educational Research  
and Training, 2006**

**ALL RIGHTS RESERVED**

- ❑ No part of this publication may be reproduced, stored in a retrieval system or transmitted, in any form or by any means, electronic, mechanical, photocopying, recording or otherwise without the prior permission of the publisher.
- ❑ This book is sold subject to the condition that it shall not, by way of trade, be lent, re-sold, hired out or otherwise disposed of without the publisher's consent, in any form of binding or cover other than that in which it is published.
- ❑ The correct price of this publication is the price printed on this page. Any revised price indicated by a rubber stamp or by a sticker or by any other means is incorrect and should be unacceptable.

**OFFICES OF THE PUBLICATION  
DEPARTMENT, NCERT**

NCERT Campus  
Sri Aurobindo Marg  
New Delhi 110 016

108, 100 Feet Road  
Hosdakere Halli Extension  
Banashankari III Stage  
Bangalore 560 085

Navjivan Trust Building  
P.O. Navjivan  
Ahmedabad 380 014

CWC Campus  
Opp. Dhankal Bus Stop  
Panihati  
Kolkata 700 114

CWC Complex  
Maligaon  
Guwahati 781 021

**Rs. 30.00**

Printed on 80 GSM paper with NCERT  
watermark

Published at the Publication Department  
by the Secretary, National Council of  
Educational Research and Training,  
Sri Aurobindo Marg, New Delhi 110 016  
and printed at M/s J.J. Offset, 522,  
Patparganj Industrial Area,  
New Delhi 110 092

**Publication Team**

Head, Publication : *P. Rajakumar*  
Department

Chief Production : *Shiv Kumar*  
Officer

Chief Editor : *Shveta Uppal*

Chief Business : *Gautam Ganguly*  
Manager

Asstt. Production : *Rajendra Chauhan*  
Officer

**Cover, Layout and Illustrations**

*Nidhi Wadhwa*





## Foreword



The National Curriculum Framework (NCF), 2005, recommends that children's life at school must be linked to their life outside the school. This principle marks a departure from the legacy of bookish learning which continues to shape our system and causes a gap between the school, home and community. The syllabi and textbooks developed on the basis of NCF signify an attempt to implement this basic idea. They also attempt to discourage rote learning and the maintenance of sharp boundaries between different subject areas. We hope these measures will take us significantly further in the direction of a child-centred system of education outlined in the National Policy on Education (1986).

The success of this effort depends on the steps that school principals and teachers will take to encourage children to reflect on their own learning and to pursue imaginative activities and questions. We must recognise that given space, time and freedom, children generate new knowledge by engaging with the information passed on to them by adults. Treating the prescribed textbook as the sole basis of examination is one of the key reasons why other resources and sites of learning are ignored. Inculcating creativity and initiative is possible if we perceive and treat children as participants in learning, not as receivers of a fixed body of knowledge.

These aims imply considerable change in school routines and mode of functioning. Flexibility in the daily time-table is as necessary as rigour in implementing the annual calendar so that the required number of teaching days are actually devoted to teaching. The methods used for teaching and evaluation will also determine how effective this textbook proves for making children's life at school a happy experience, rather than a source of stress or boredom. Syllabus designers have tried to address the problem of curricular burden by restructuring and reorienting knowledge at different stages with greater consideration for child psychology and the time available for teaching. The textbook attempts to enhance this endeavour by giving higher priority and space to opportunities for contemplation and wondering, discussion in small groups, and activities requiring hands-on experience.

The National Council of Educational Research and Training (NCERT) appreciates the hard work done by the textbook development committee responsible for this book. We wish to thank the Chairperson of



the advisory committee for textbooks at the primary level, Professor Anita Rampal and the Chief Advisor for this book, Rohit Dhankar, *Director*, Digantar for guiding the work of this committee. Several teachers contributed to the development of this textbook; we are grateful to their principals for making this possible. We are indebted to the institutions and organisations which have generously permitted us to draw upon their resources, material and personnel. We are especially grateful to the members of the National Monitoring Committee, appointed by the Department of Secondary and Higher Education, Ministry of Human Resource Development under the Chairpersonship of Professor Mrinal Miri and Professor G.P. Deshpande, for their valuable time and contribution. As an organisation committed to systemic reform and continuous improvement in the quality of its products, NCERT welcomes comments and suggestions which will enable us to undertake further revision and refinement.

New Delhi  
20 December 2005

*Director*  
National Council of Educational  
Research and Training





# Textbook Development Committee



## **CHAIRPERSON, ADVISORY COMMITTEE FOR TEXTBOOKS AT THE PRIMARY LEVEL**

Anita Rampal, *Professor*, Central Institute of Education, Delhi University

## **CHIEF ADVISOR**

Rohit Dhankar, *Director*, Digantar, Jaipur

## **MEMBERS**

Asmita Verma, *PRT*, Navyug School, Lodhi Colony, New Delhi

Binoda Chandra Ojha, *PRT*, Fateh Public School, Sawai Madhopur, Rajasthan

Gita Mahashabdo, Navnirmitti, Near Pawai Municipal Hospital, Pawai, Mumbai

L.K. Bhopa, Regional Institute of Education, Bhubaneswar, Orissa

M. Sharda, *TGT*, Demonstration Multipurpose School, Regional Institute of Education, Mysore

N. Harini, *PRT*, Demonstration Multipurpose School, Regional Institute of Education, Mysore

## **MEMBER-COORDINATOR**

Surja Kumari, *Professor*, Department of Elementary Education, NCERT, New Delhi





## Acknowledgements

The National Council of Educational Research and Training acknowledges the valuable contributions of the participants of the Review Workshop in the finalisation of this book — Maitrar Sasmal, *PRT*, Kendriya Vidyalaya, Sector IV, R.K. Puram, New Delhi; Subra Singh, *PRT*, Kendriya Vidyalaya, NCERT Branch, New Delhi; Rupinder Kaur, *PRT*, Guru Harkishan Public School, New Delhi; Arun T. Mavalankar, Homi Babha Centre for Science Education, Mumbai.

Special thanks are due to Professor K.K. Vashishtha, *Head*, DEE, NCERT for his support during the development of this book.

The Council also gratefully acknowledges the contributions of Subodh and Sadiq Saeed, *DTP Operators*, and Bharati Guleria, *Copy Editor* during the preparation of the book and *Incharge*, Computer Station, Shakambar Dutt, in shaping this book. The efforts of the Publication Department, NCERT in bringing out this book, are also highly appreciated.





# Contents

Foreword

iii

1. Shapes and Space

1

2. Numbers from One to Nine

21

3. Addition

51

4. Subtraction

61

5. Numbers from Ten to Twenty

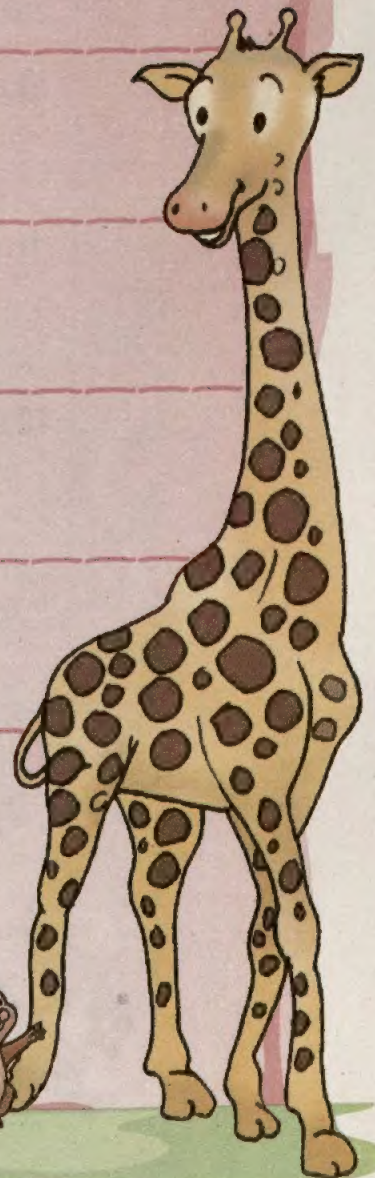
69

6. Time

89

7. Measurement

93







8. Numbers from Twenty-one to Fifty 104

9. Data Handling 109

10. Patterns 111

11. Numbers 117

12. Money 124

13. How Many 130

Teacher's Notes 134-146

The Shape Kit 147-150





# **THE CONSTITUTION OF INDIA**

## **PREAMBLE**

**WE, THE PEOPLE OF INDIA**, having solemnly resolved to constitute India into a **SOVEREIGN SOCIALIST SECULAR DEMOCRATIC REPUBLIC** and to secure to all its citizens :

**JUSTICE**, social, economic and political;

**LIBERTY** of thought, expression, belief, faith and worship;

**EQUALITY** of status and of opportunity; and to promote among them all

**FRATERNITY** assuring the dignity of the individual and the unity and integrity of the Nation;

**IN OUR CONSTITUENT ASSEMBLY** this twenty-sixth day of November, 1949, do **HEREBY ADOPT, ENACT AND GIVE TO OURSELVES THIS CONSTITUTION.**





S. Amal Jerry Arputharaj, 10 years.  
St. Patrick Modern Higher Secondary School, Pondicherry





# Shapes and Space


## Inside - Outside

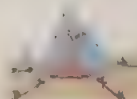
The Arab  and his Camel.



It was a cold winter day. The  was travelling on the



back. At night, the 

pitched his tent 

and went **inside** it. 

The 

was **outside**

May I put my  
neck **inside**?  
It is too cold  
**outside**.



Okay!  
You may put  
your neck **inside**.



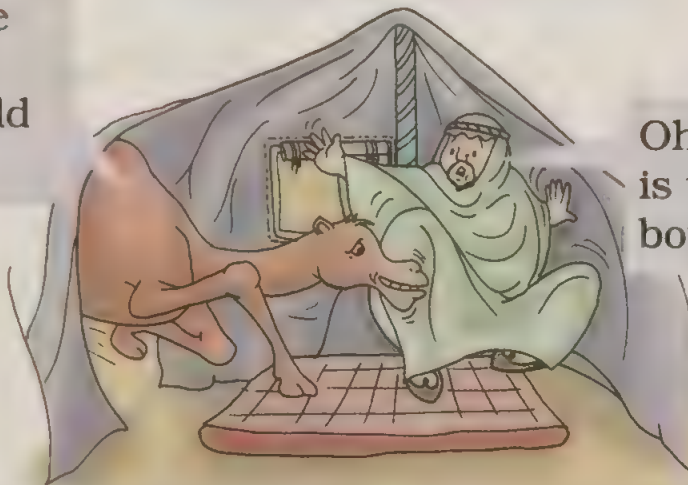


May I put my  
front legs **inside**?  
It is too cold  
**outside**.



Okay! You may  
put your front  
legs **inside**.

Can I come  
**inside**?  
It is too cold  
**outside**.



Oh! No the tent  
is too small for  
both of us.

So I am coming  
**inside** and  
you go **outside**.



Camel



Arab



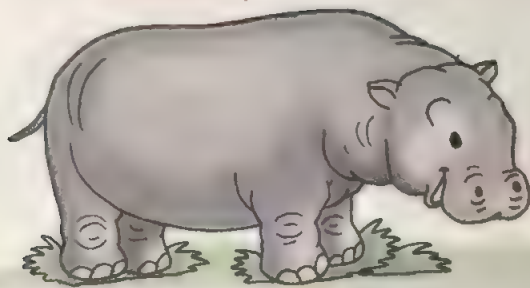
Tent



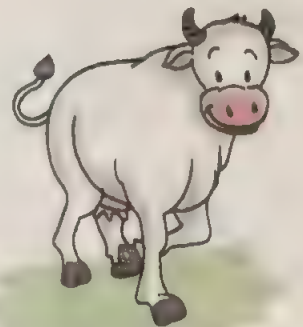
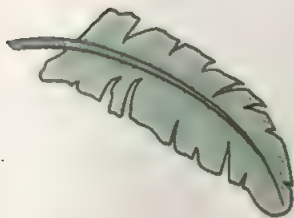


## Bigger - Smaller

Tick(✓) the bigger.



Tick(✓) the smaller.



Tick(✓) the smaller tyre.







## Biggest-Smallest

Tick (✓) the **smallest** tree.



Tick (✓) the **biggest** animal.



Tick(✓) the **smallest** fruit.



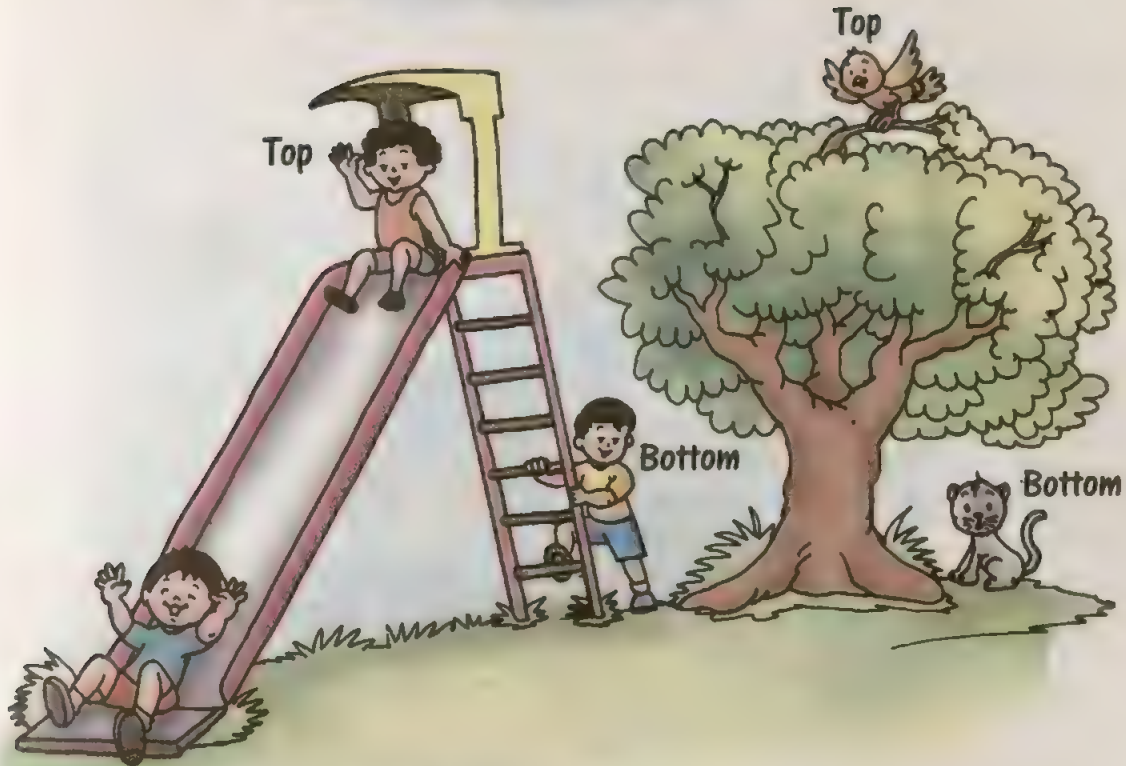
Tick(✓) the **biggest** bubble.







## Top-Bottom



Tick(✓) the pot on the **top**.



Tick(✓) the animal  
at the **bottom** of  
the stairs.







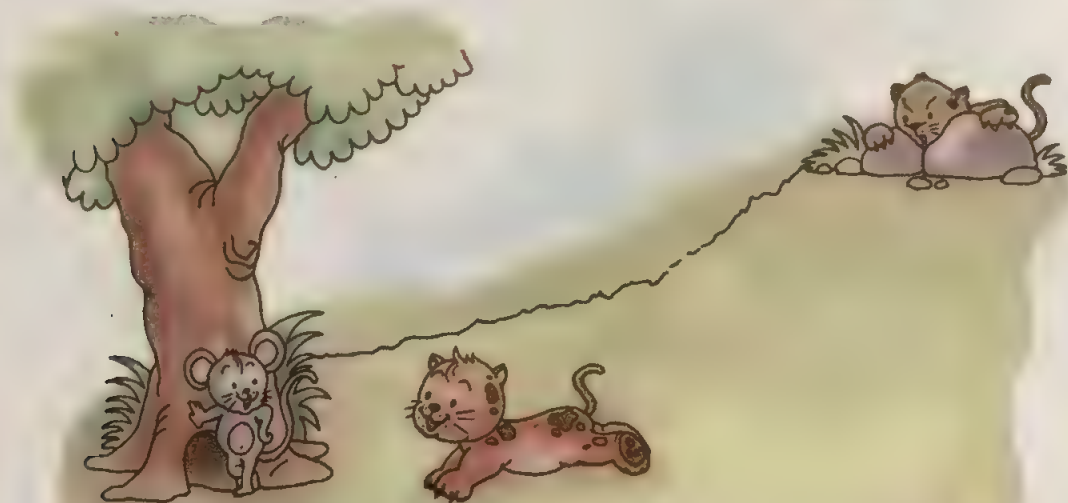
## Nearer-Farther

Tick(✓) the bird **nearer** to home.



---

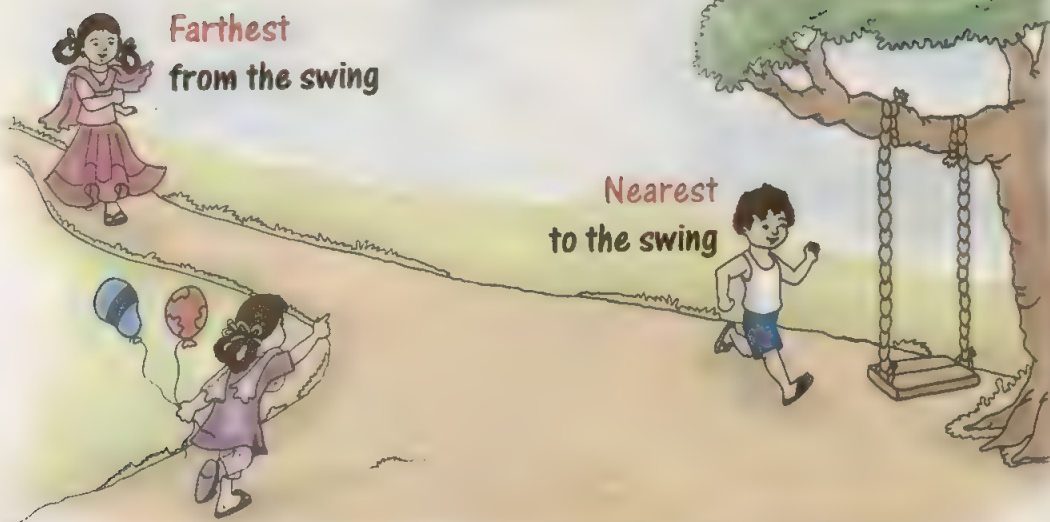
Tick(✓) the cat **farther** from the tree.







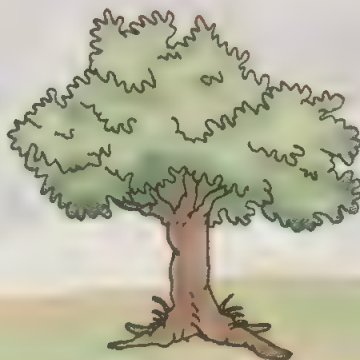
## Nearest-Farthest



Tick(✓) the puppy farthest from the tree.



Tick(✓) the tree nearest to the bird.



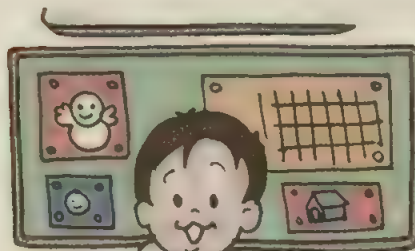




# On-Under Above-Below



Above the table



Below  
the fan

On the  
table



Under  
the table





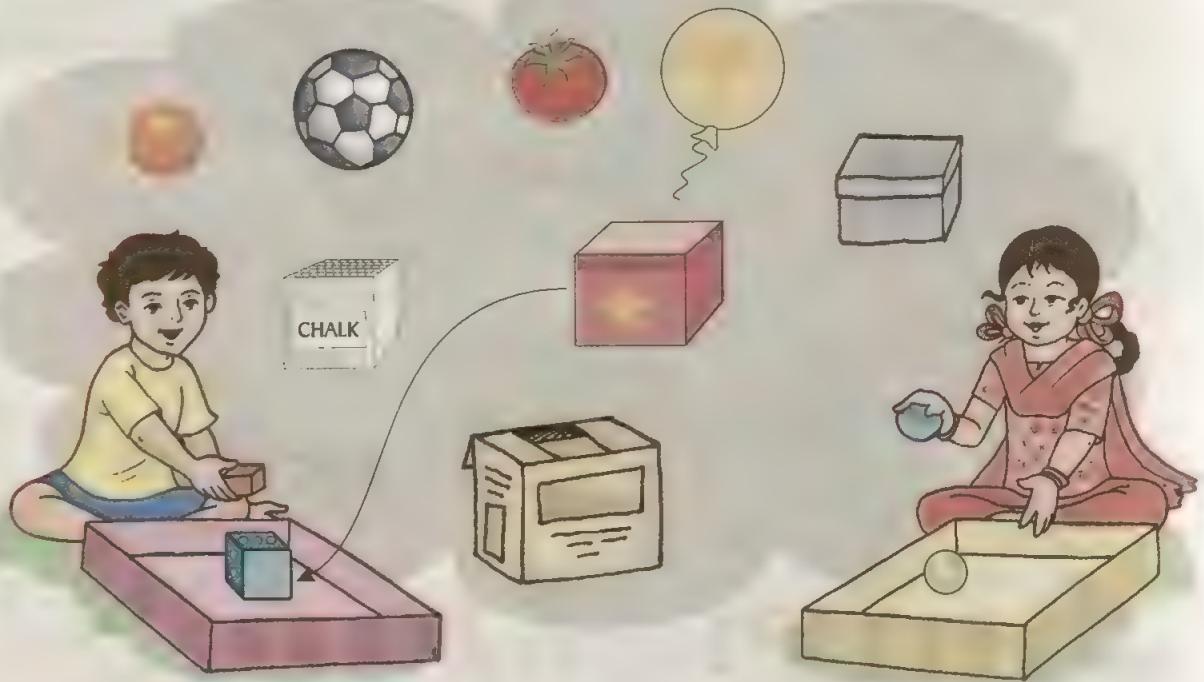
Discuss near-far, top-bottom.



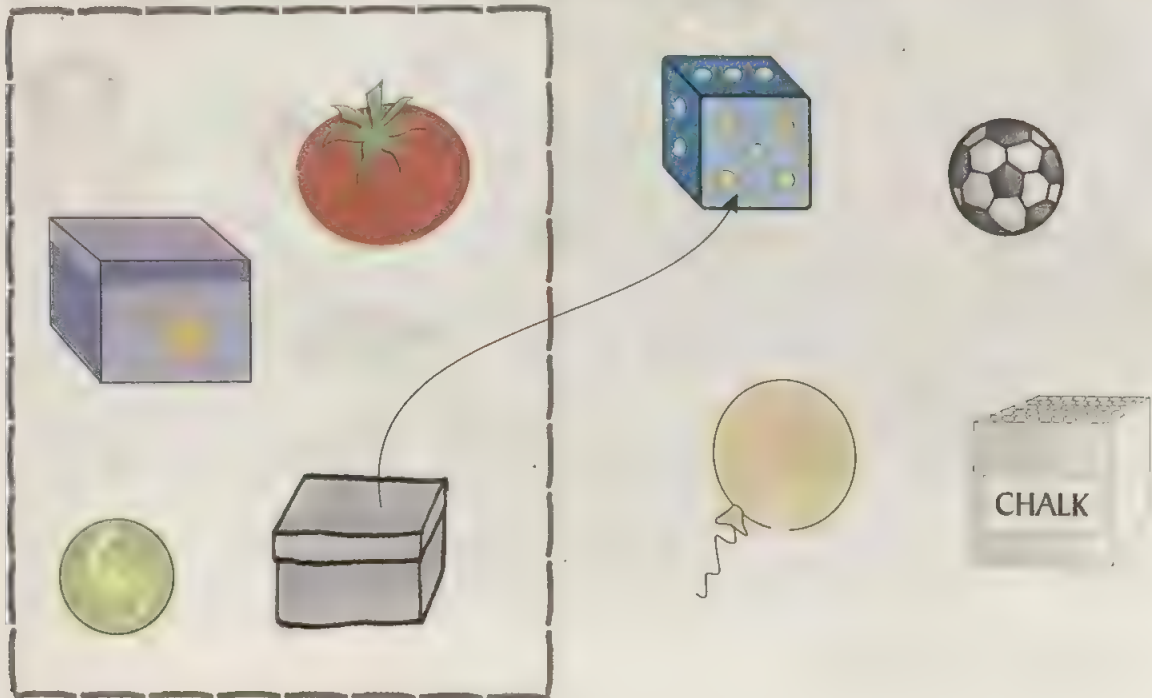


## Shapes around us

Put the shapes in the pink and yellow boxes by drawing a line.

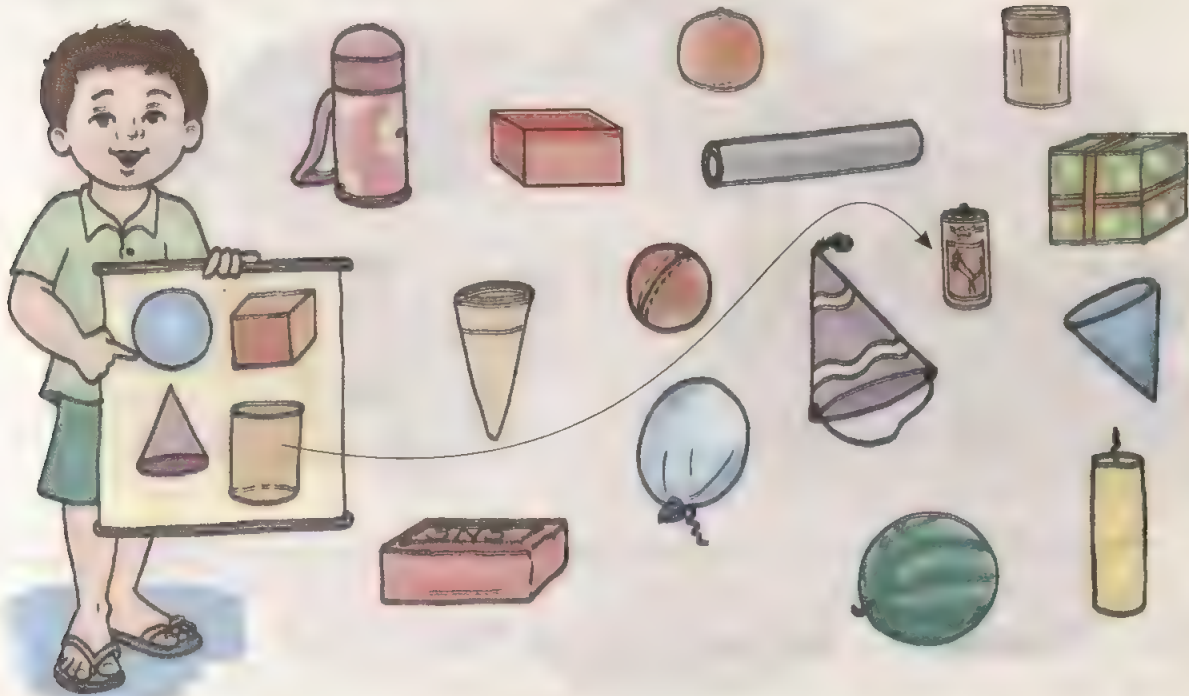


Match the similar shapes by drawing a line.



# Sorting

Sort shapes by joining with similar shapes.



Make pairs of similar shapes.



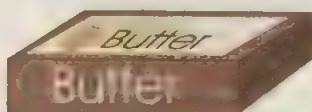




## Rolling - Sliding



Tick(✓) the objects that will roll



Tick(✓) the objects that will slide





## Wise Grandmother

Once there was a Lamb going to see his grandmother.



On the way, through the jungle he met a wolf.

I am going to eat you.



Please let me go! I am going to meet my grandmother. You can eat me when I return.



When he was about to return, he told the grandmother about the wolf.



The grandmother gave him an idea.

Go, and hide yourself in a dholak.



He did so!



The grandmother rolled the dholak on the road.



The lamb saw the wolf waiting for him.

Did you see a lamb coming this way?

No!



The dholak started rolling down.

The wolf grew suspicious and started running behind the dholak.

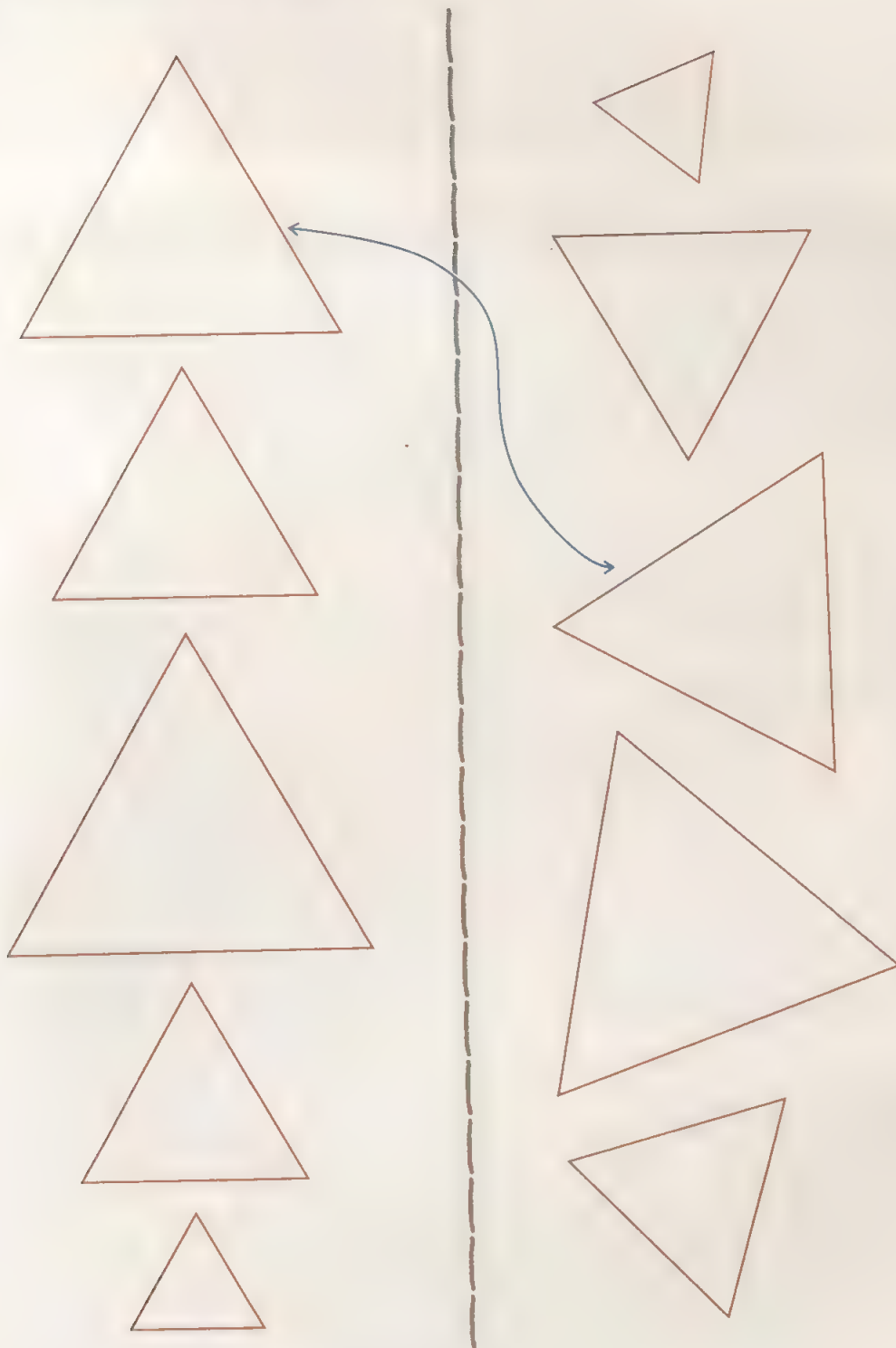


Before the wolf could catch him, the lamb reached home and was thankful to his grandmother.



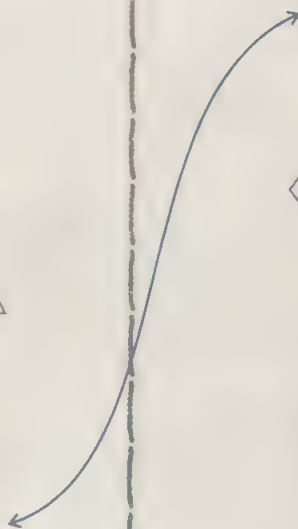
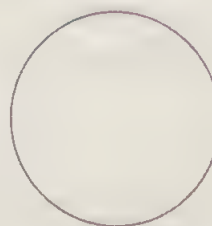
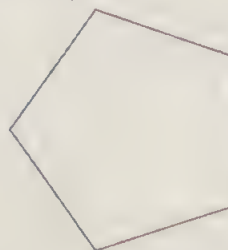
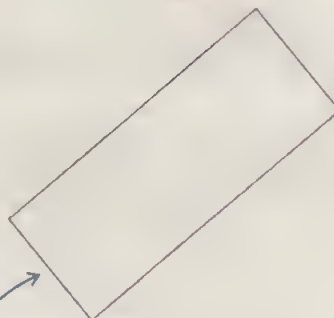
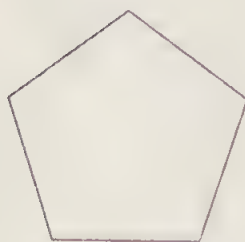
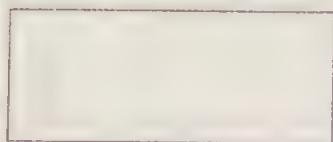
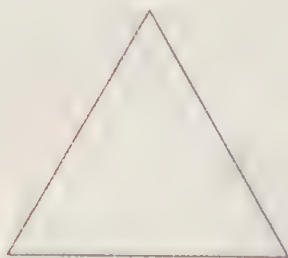
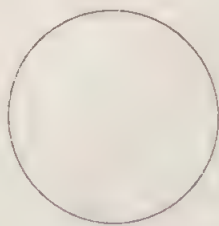
# Shapes

Match the shapes of same sizes.



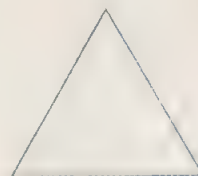
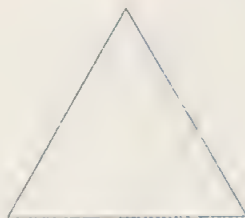
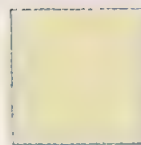


Match the same shapes.



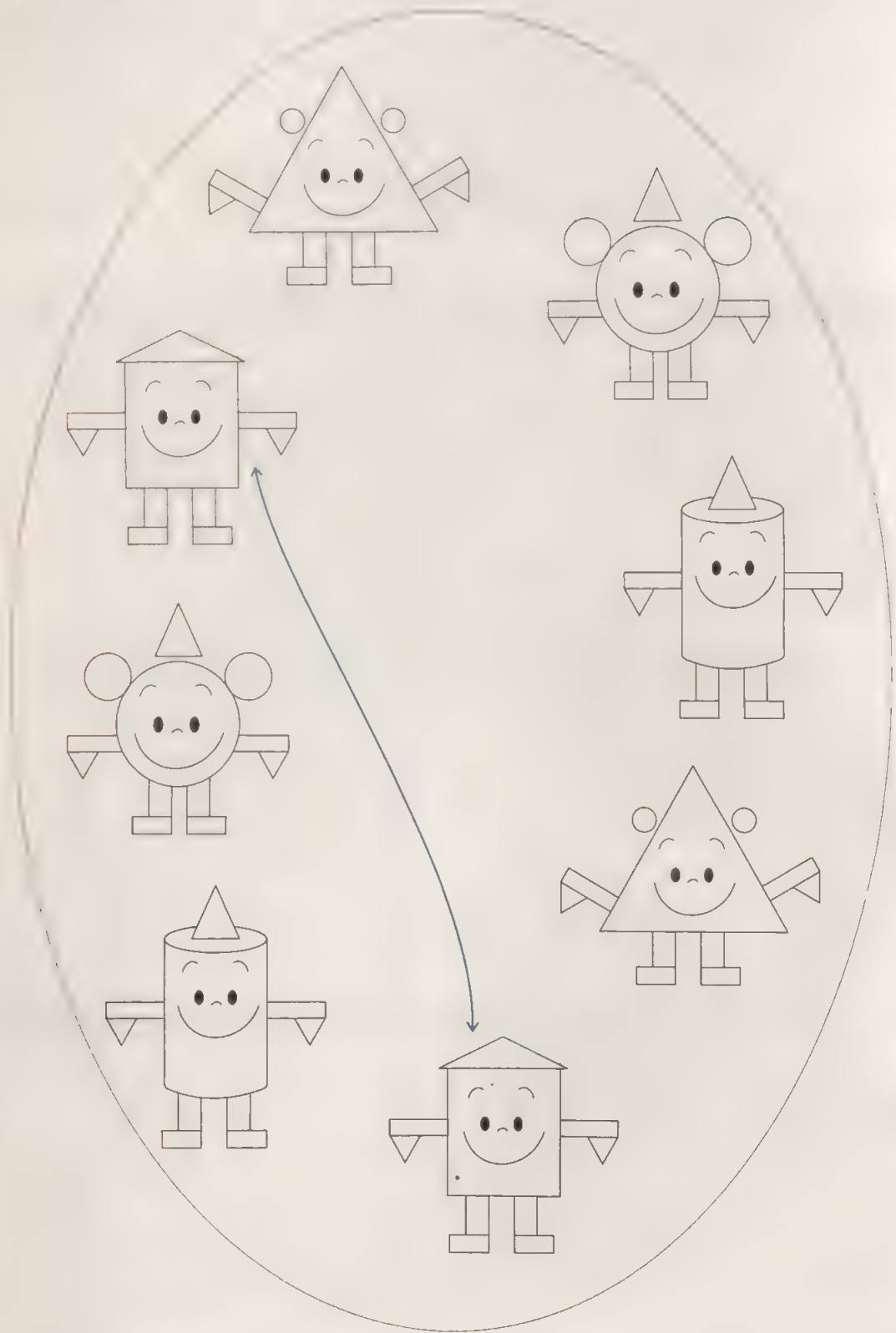
Colour the smallest shape.

13170  
11.3.2008

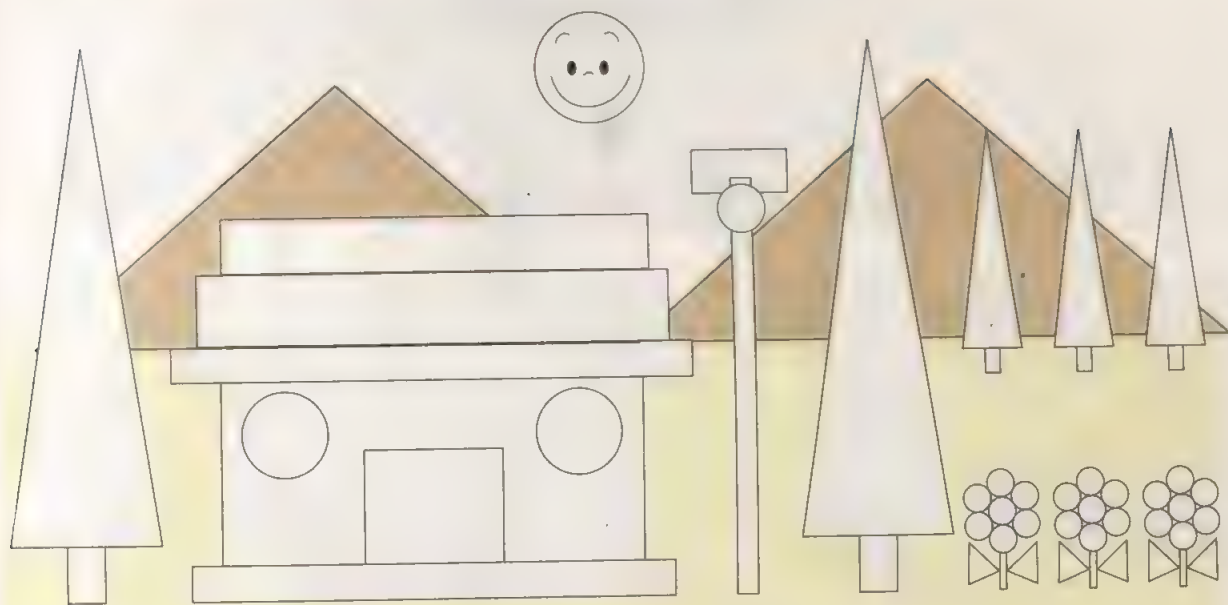




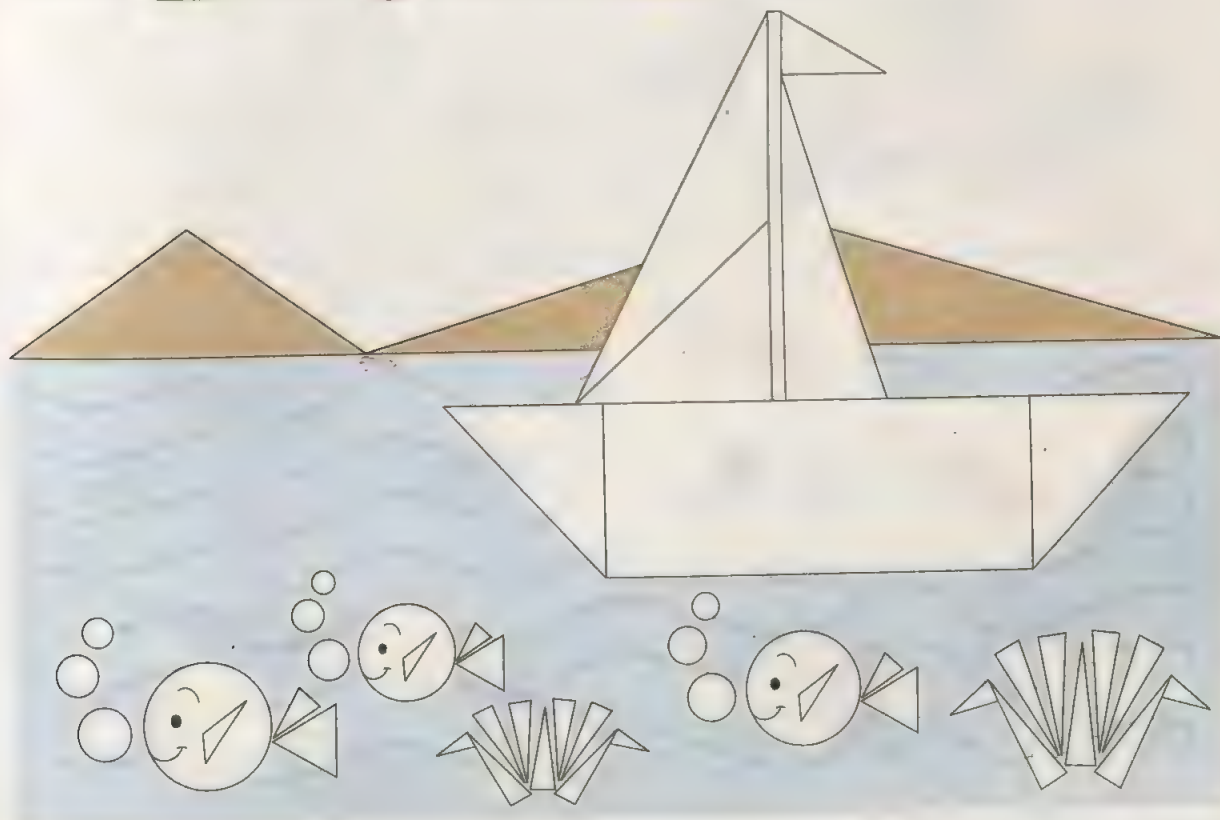
Join the similar shapes.



Colour ▲ green, ● red and ■ blue.



Colour ▲ green, ● pink and ■ yellow.





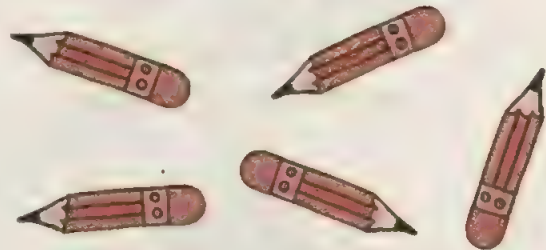
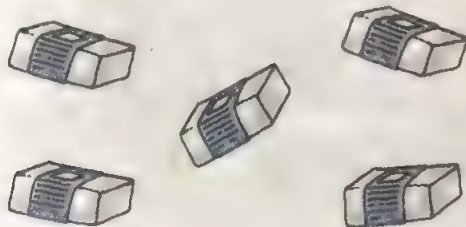
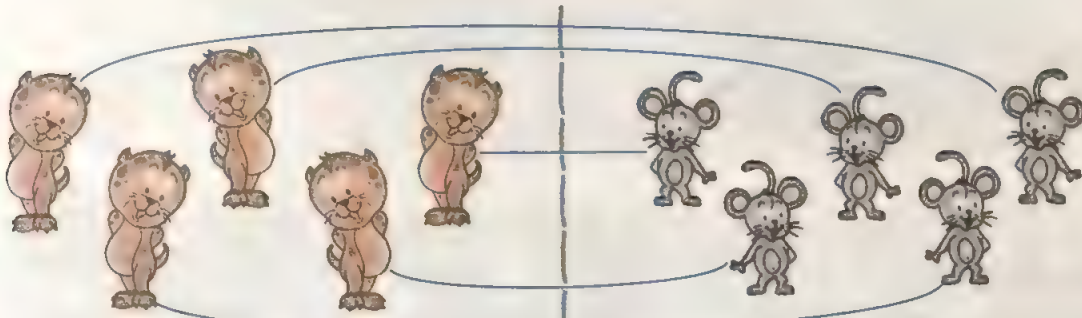
Make similar figures using the shape kit given at the back of this book.





# Numbers from One to Nine

As many as



11.3.2008  
13170





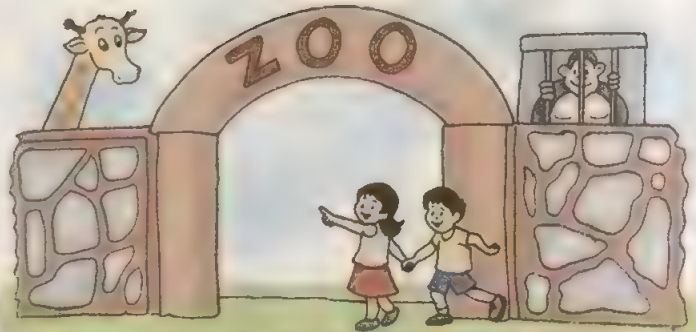


# Counting



One One One  
One little baby  
eating a bun.

Two Two Two  
Two little children  
go to the zoo.



Three Three Three  
Three green parrots flying free.

Four Four Four  
Four hungry pups  
want to eat more.



Five Five Five  
Five honey bees are  
going to the hive.

Six Six Six  
Six tiny nails.  
Soni has to fix.



Seven Seven Seven  
Seven little dwarfs  
are going to heaven.



Eight Eight Eight  
Eight fat rats  
chase a cat.

Nine Nine Nine  
Nine red ants  
walk in a line.





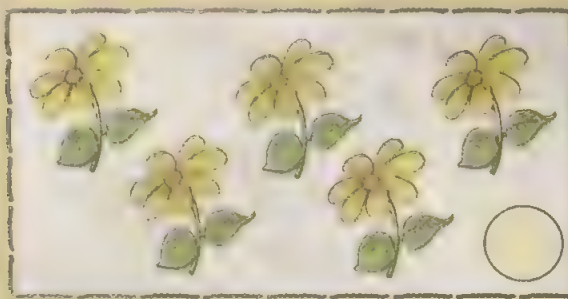


## More or Less

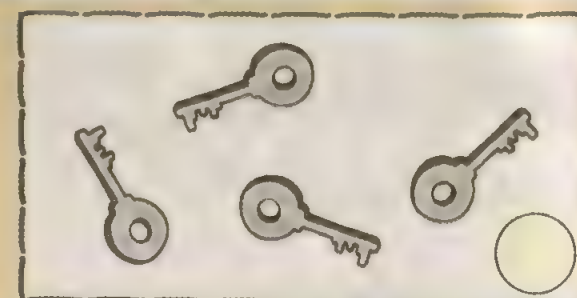
Tick(✓) more.



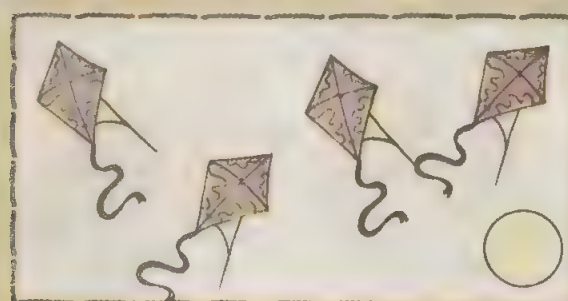
Tick(✓) less.



Tick(✓) less.

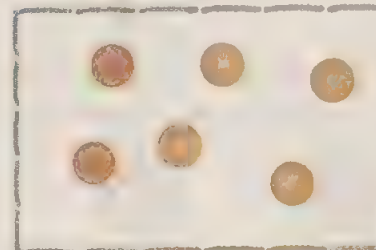
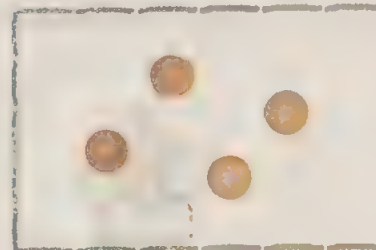
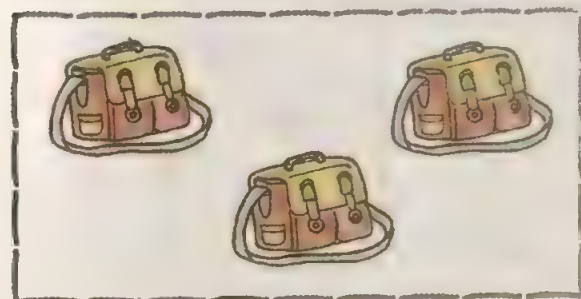
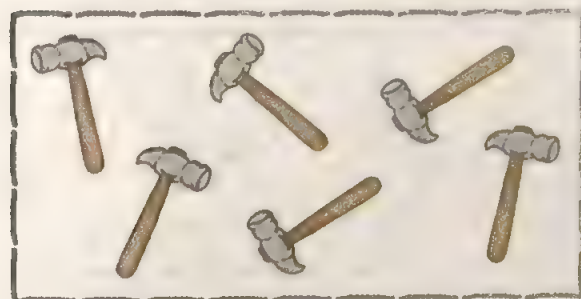
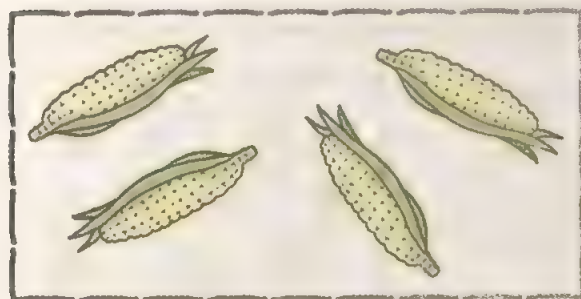


Tick(✓) more.





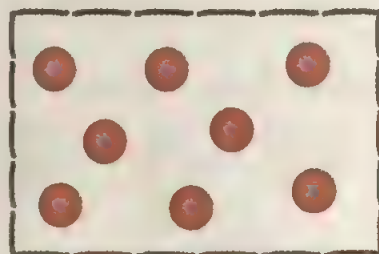
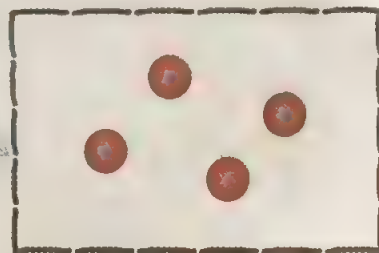
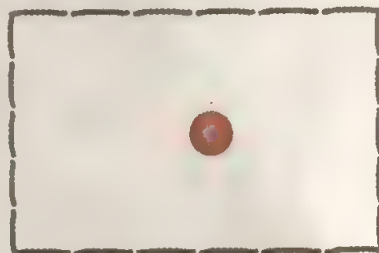
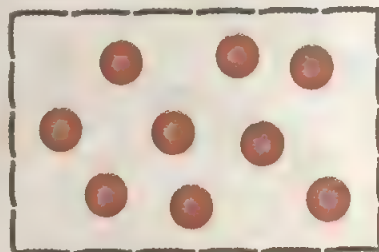
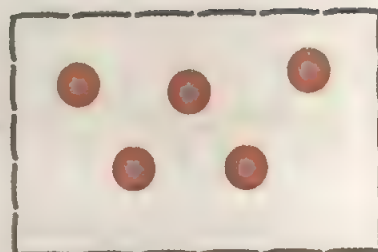
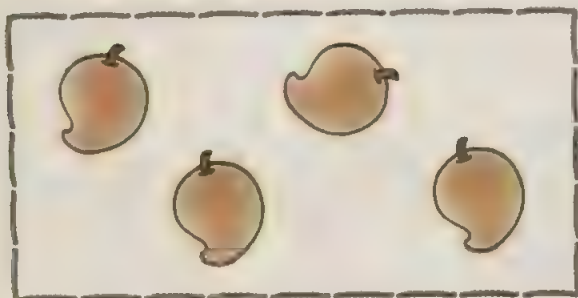
# Count and Match



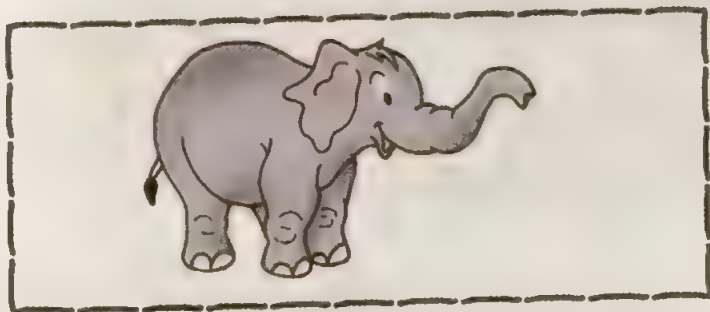
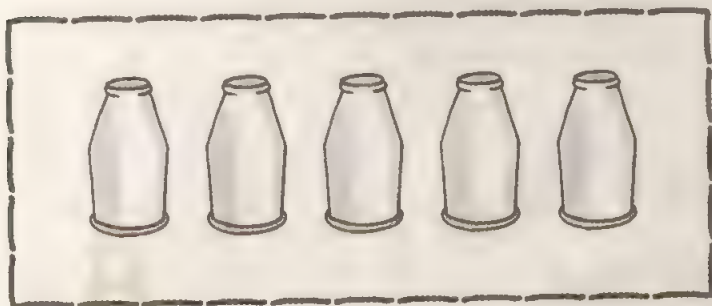




# Count and Match



Count and match.



4

3

2

1

5

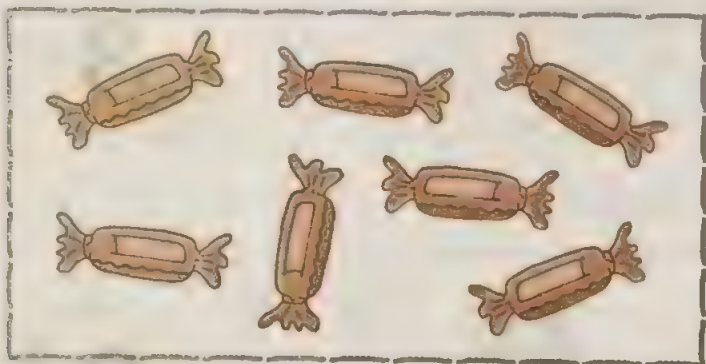




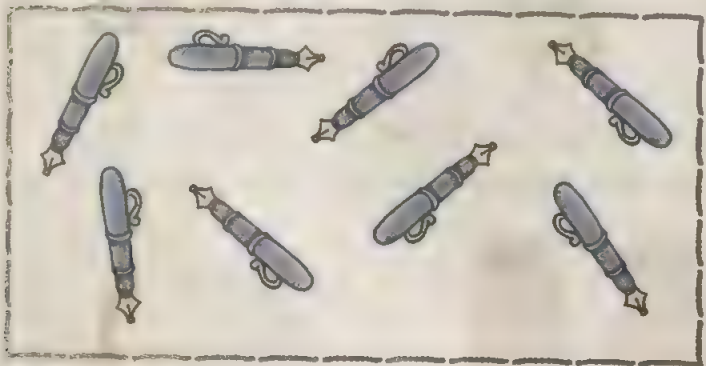
Count and match.



6



8



9



7

Match the numbers with the pictures.



1



2



6

3

7

4



8

5

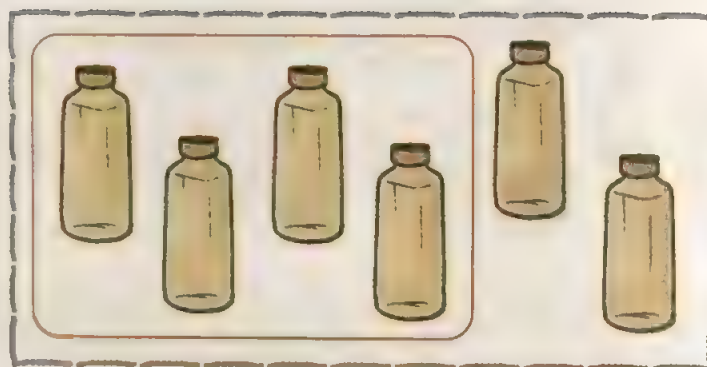
9





Make groups of

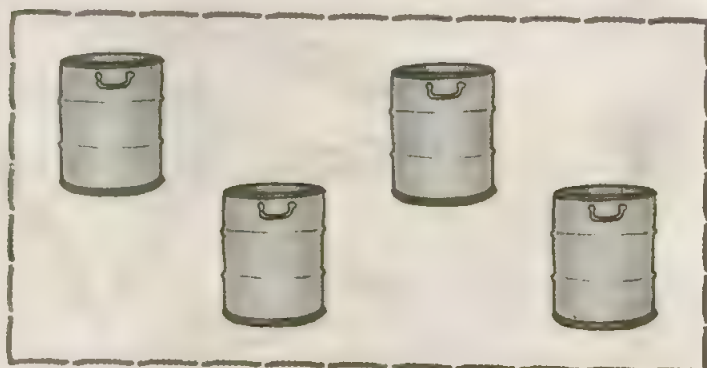
4 bottles



3 Trees



2 Drums



5 Lanterns

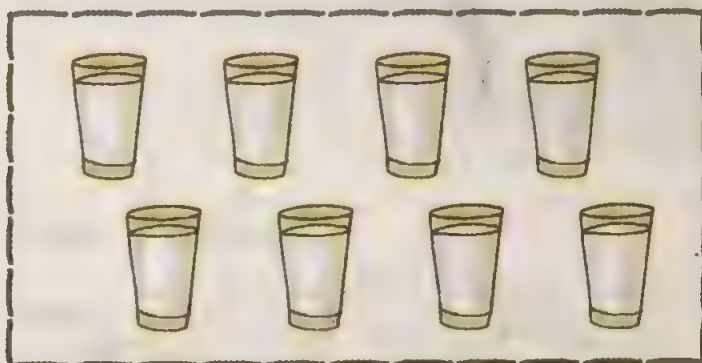


Make groups of

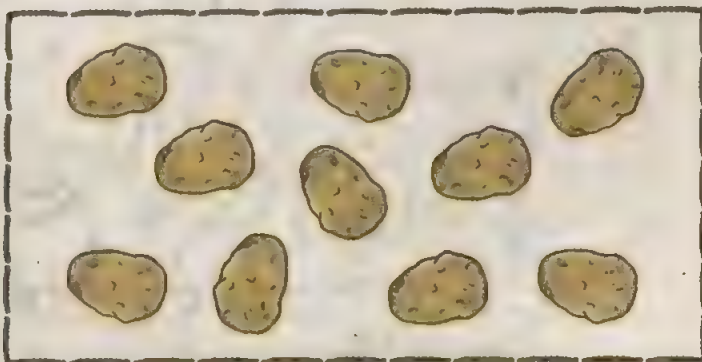
6 Leaves



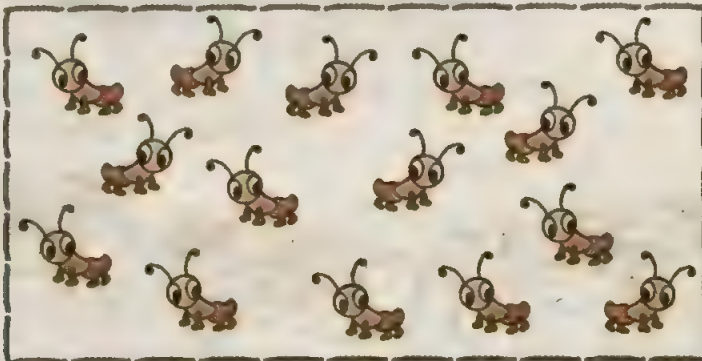
7 Glasses



8 Potatoes



9 Ants





Colour 5 balloons



Colour 4 flowers



Colour 2 trees



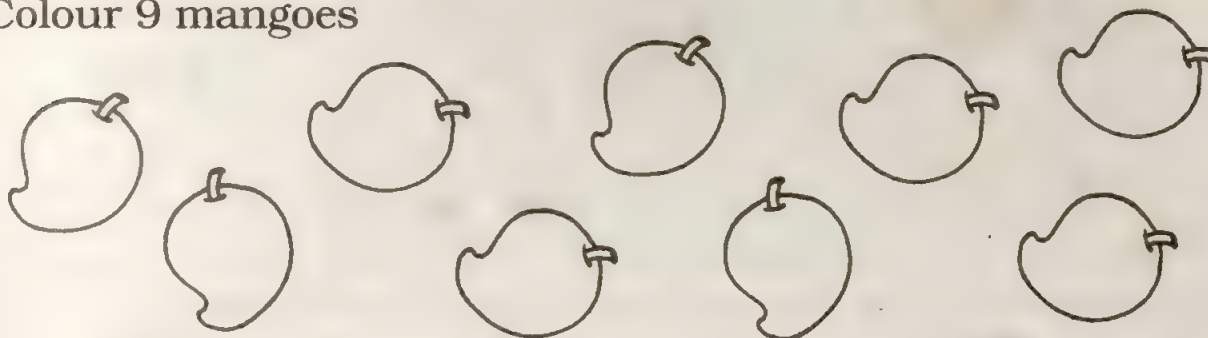
Colour 3 boats



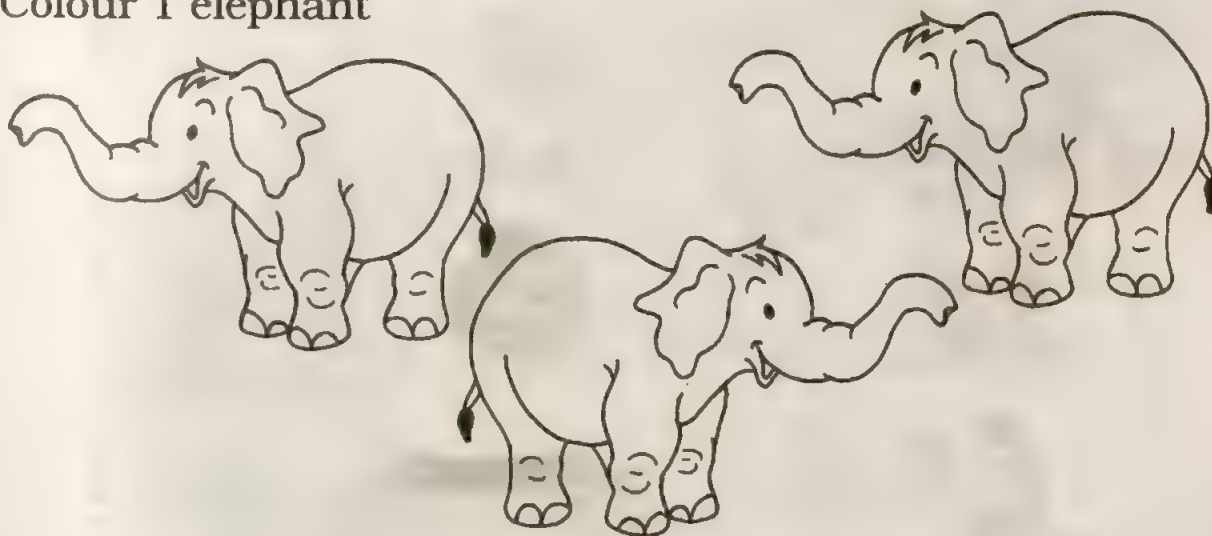
Colour 6 birds



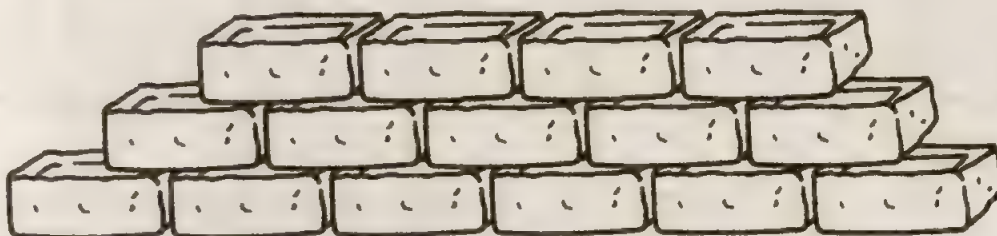
Colour 9 mangoes



Colour 1 elephant



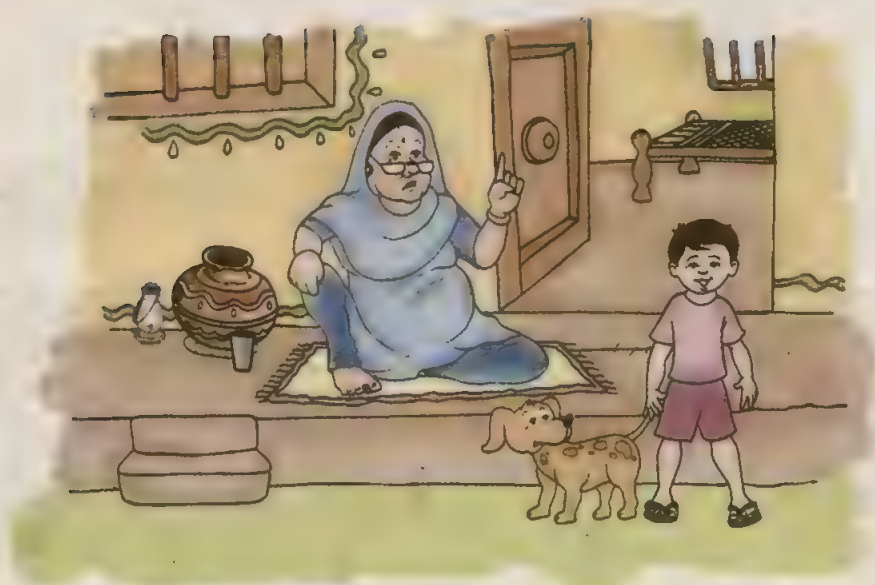
Colour 7 bricks



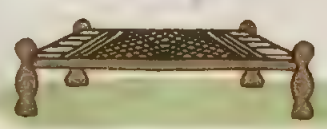




 One



One






Two



2

Two



2



2



2

2						







Three



3

Three



3



3

3

3						

Four



4

Four



4



4



4

4						







Five



5

Five



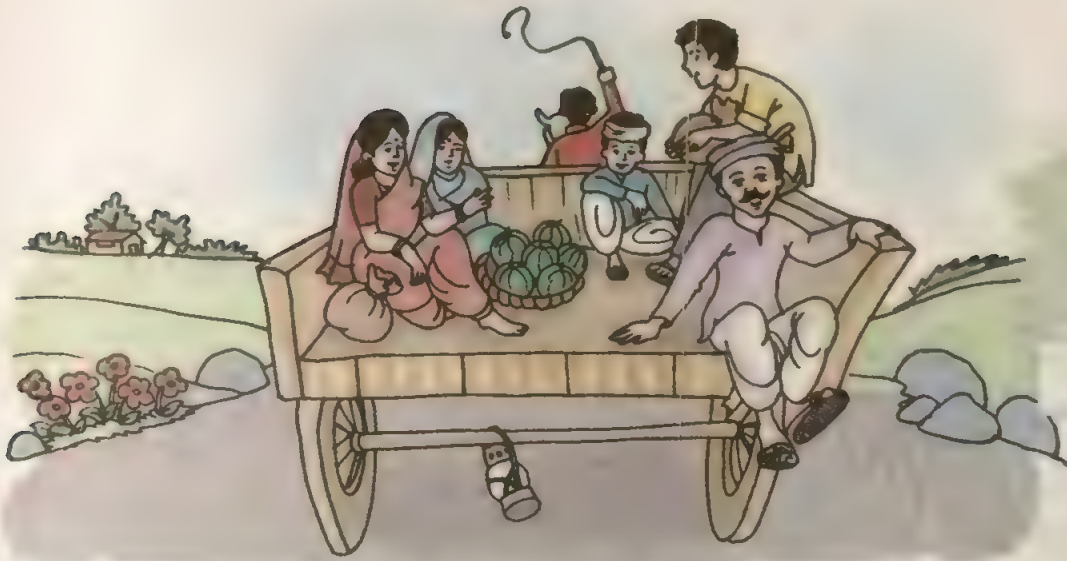
5

5

5

5						

 Six



6  
Six




6



6



6

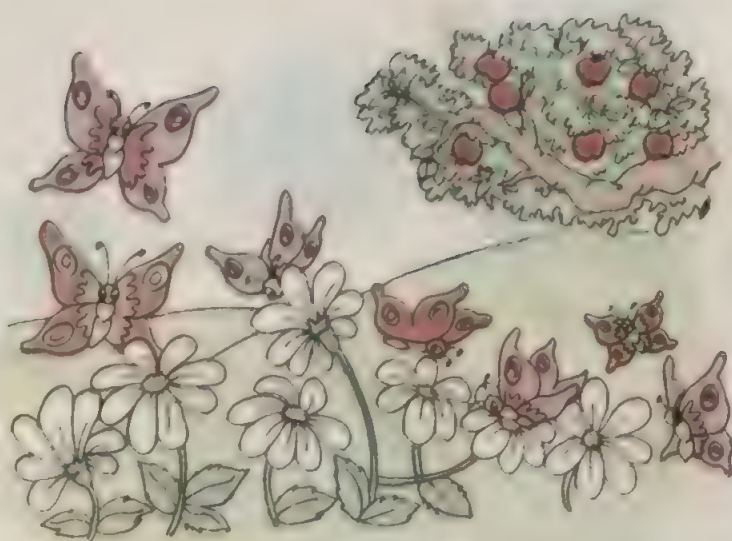
						





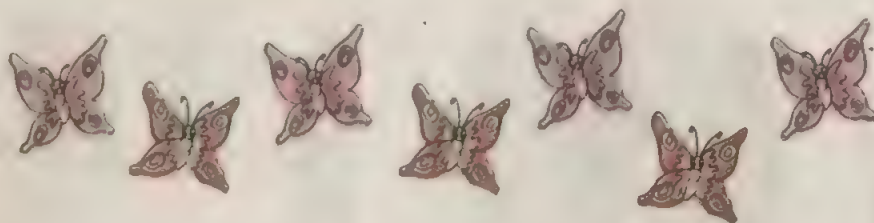


Seven



7

Seven



7



7



7

7						



Eight



8

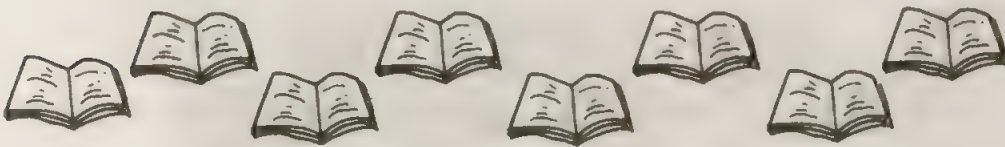
Eight



8



8



8

8						





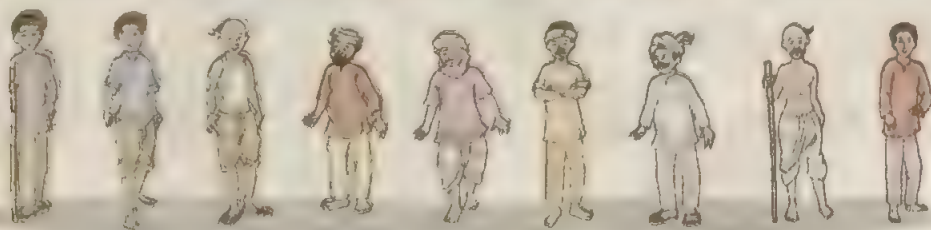


Nine



9

Nine



9



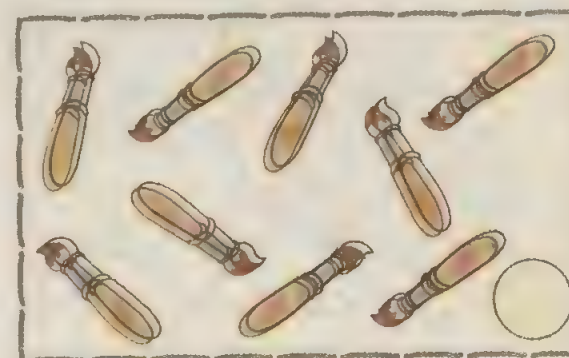
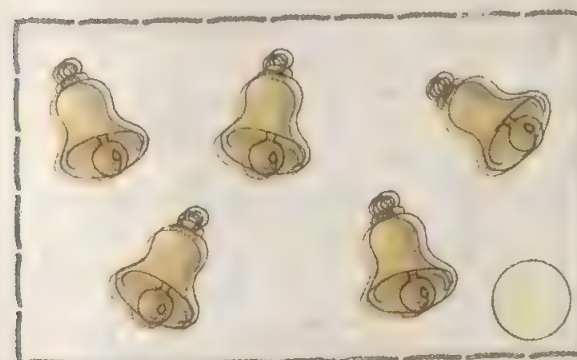
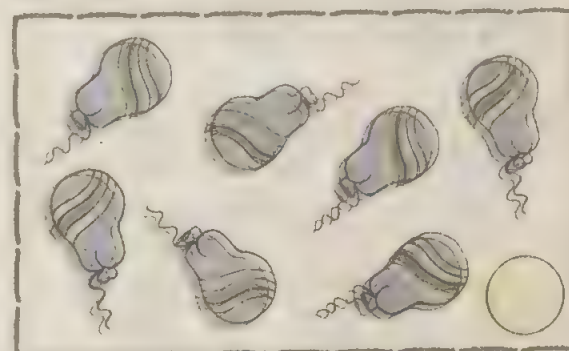
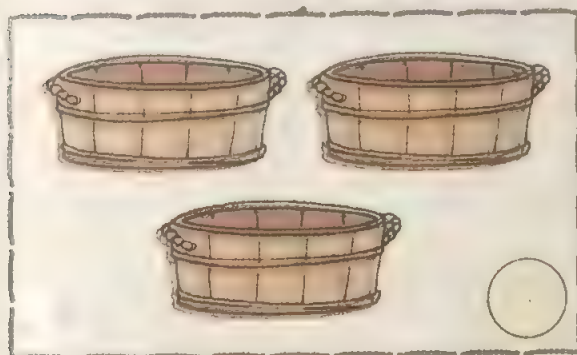
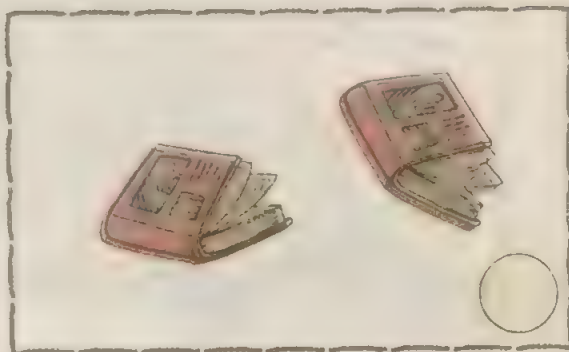
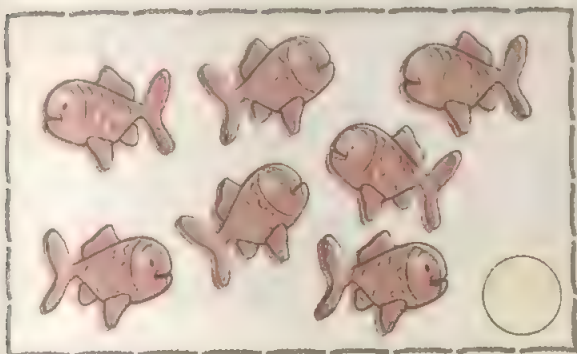
9



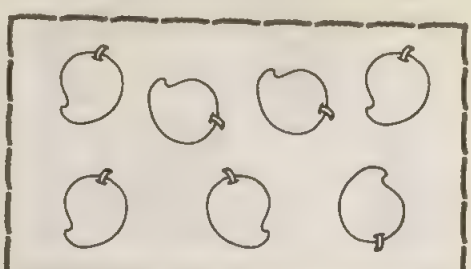
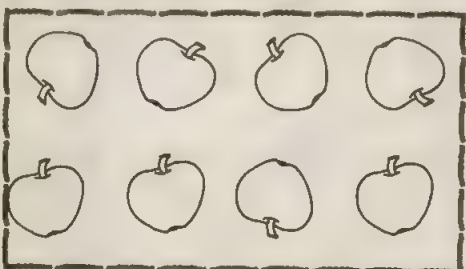
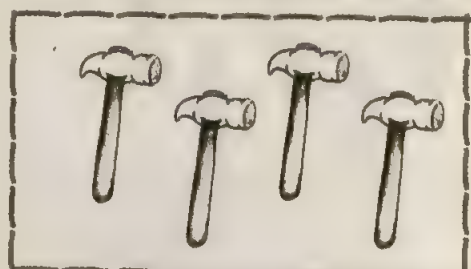
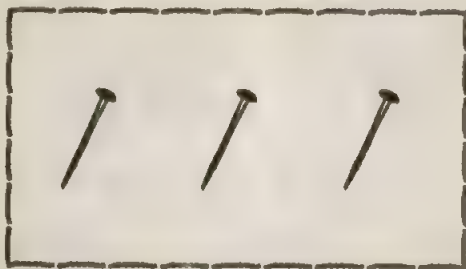
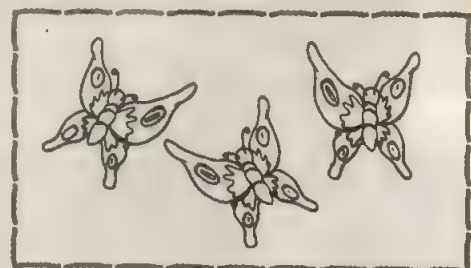
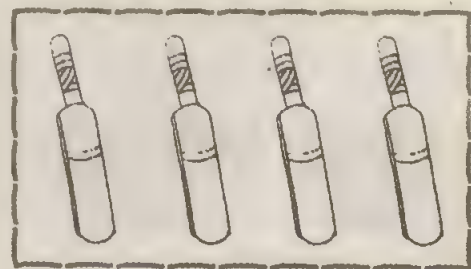
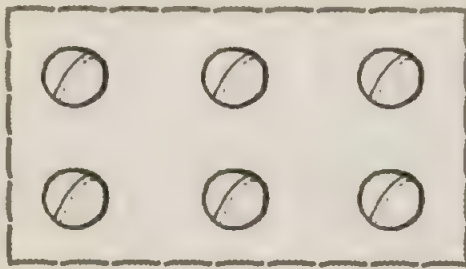
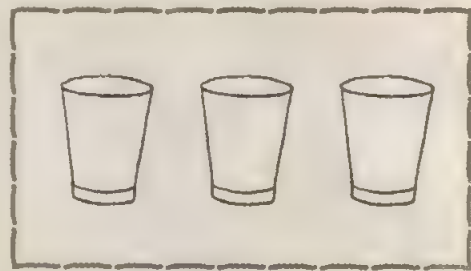
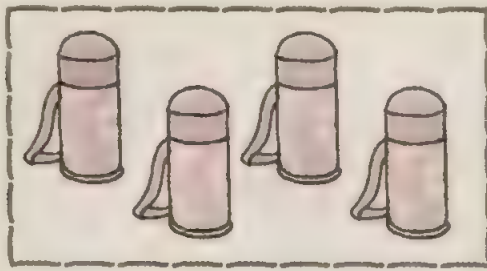
9

9						

Name these things and write their number in the circle.

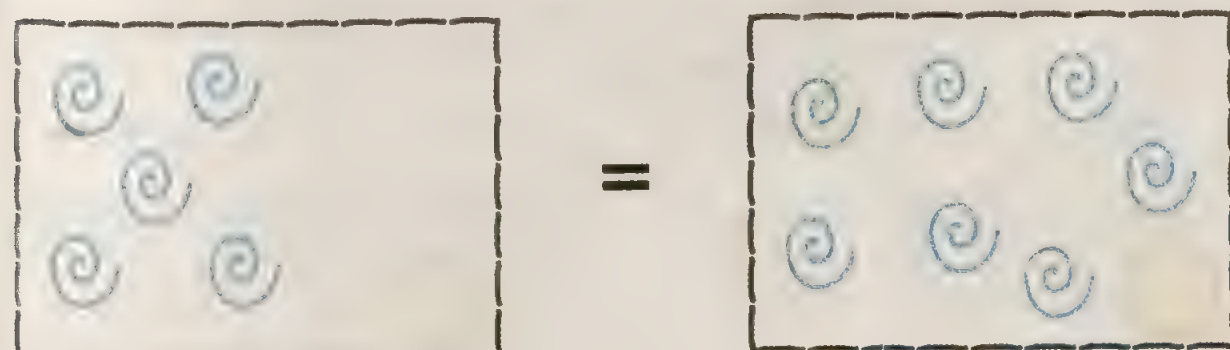
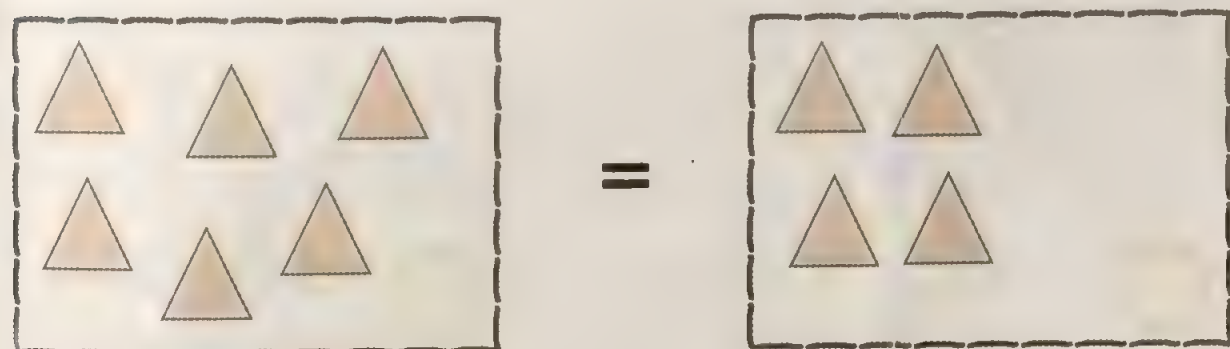
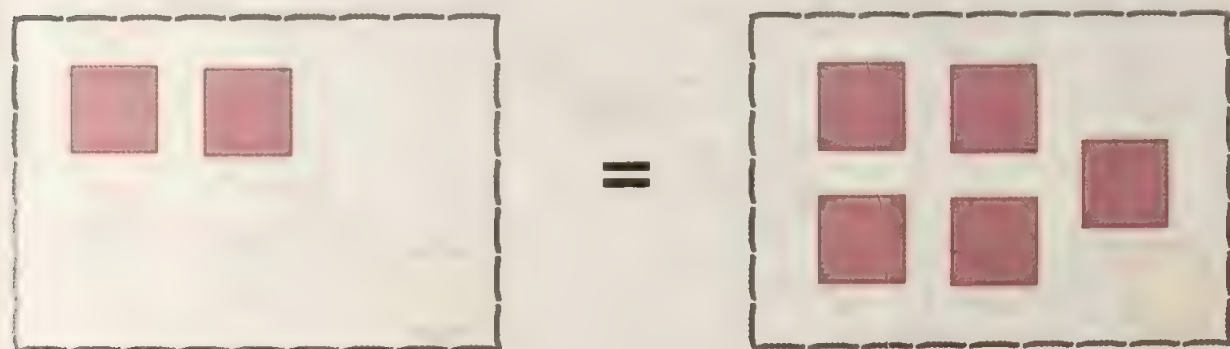
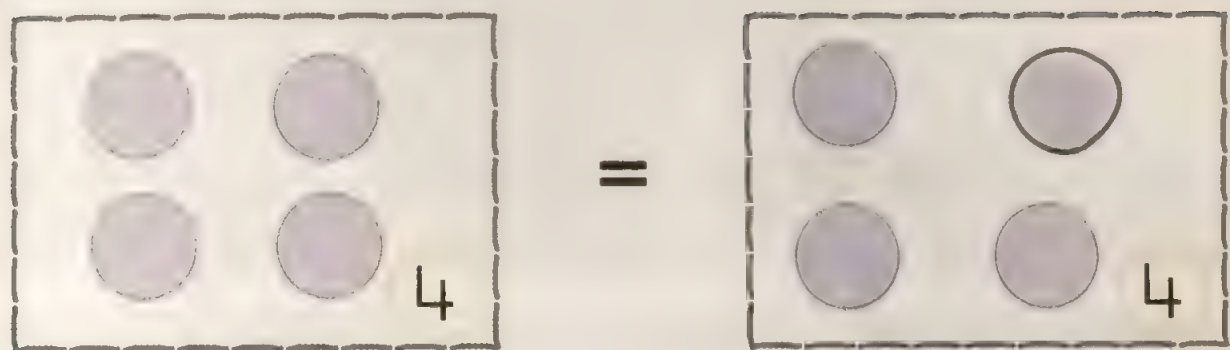


Colour the collection which has more objects.

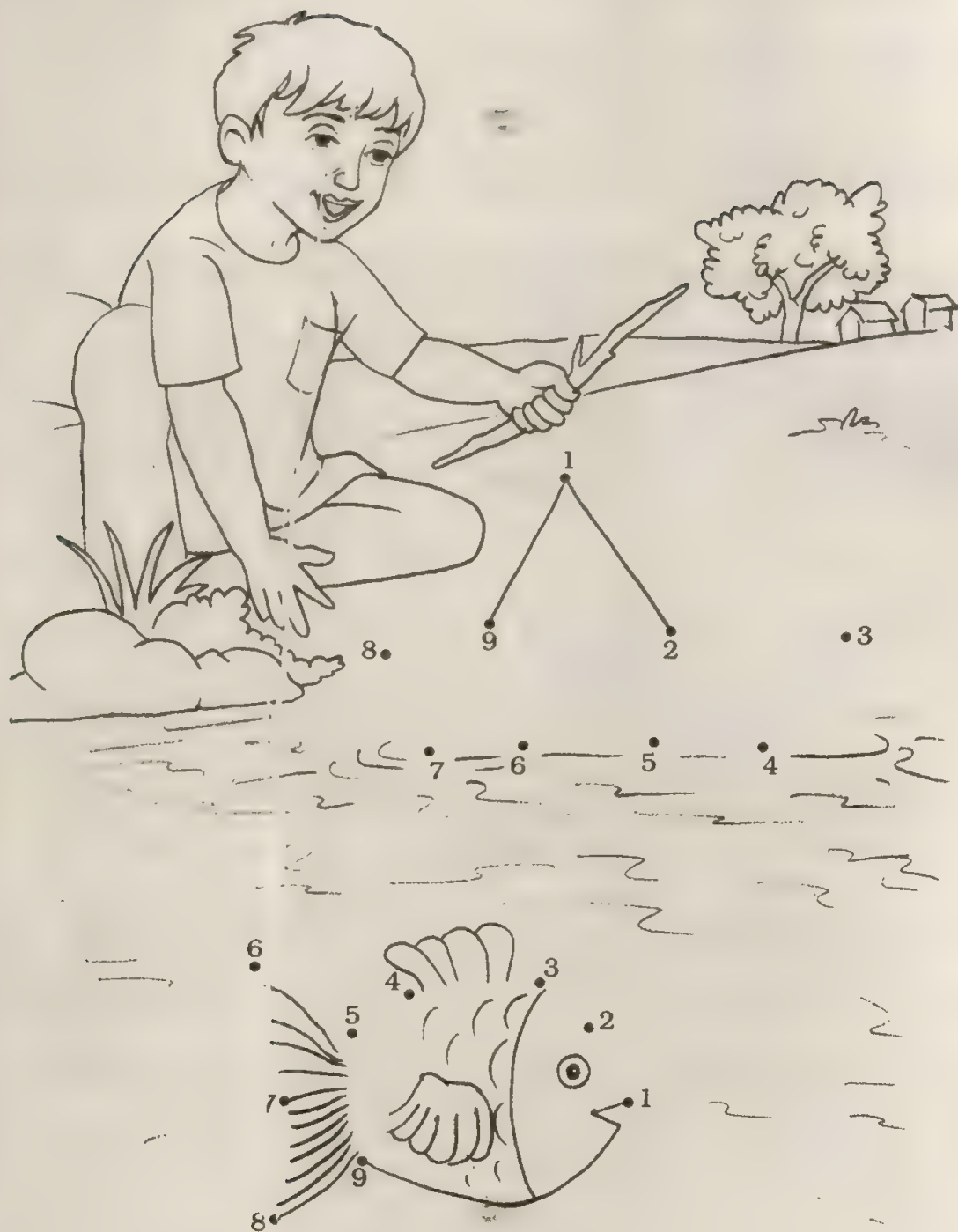




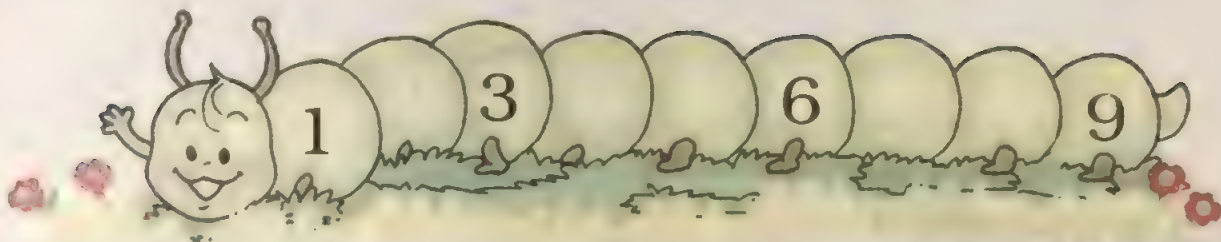
Make the collection equal.



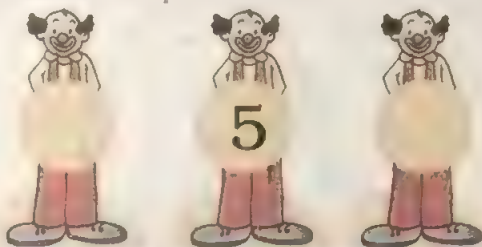
Join in order.



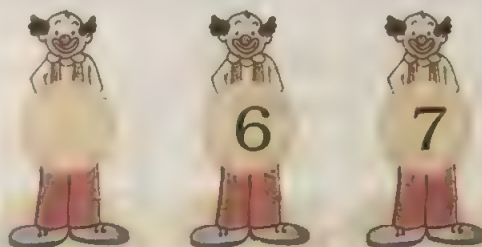
Write the missing number.



What comes before and after 5?



What comes before 6?



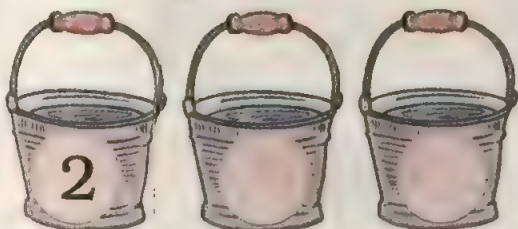
What comes after 1?



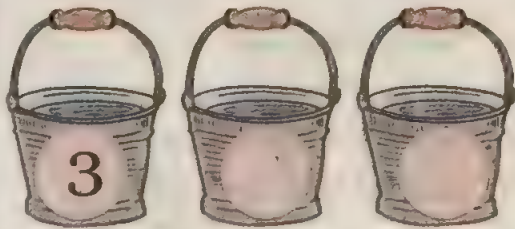
What comes before and after 4?



What are the next numbers?



What are the next numbers?

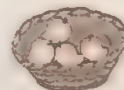




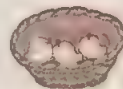


Zero

Five juicy mangoes  
kept in a basket.  
If you pick and eat one  
how many will be left?



Four juicy mangoes  
kept in a basket.  
If you pick and eat one  
how many will be left?



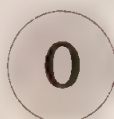
Three juicy mangoes  
kept in a basket.  
If you pick and eat one  
how many will be left?



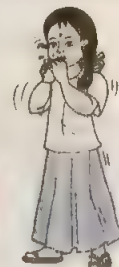
Two juicy mangoes  
kept in a basket.  
If you pick and eat one  
how many will be left?



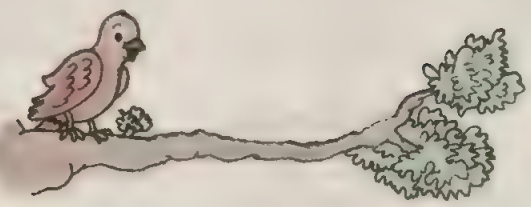
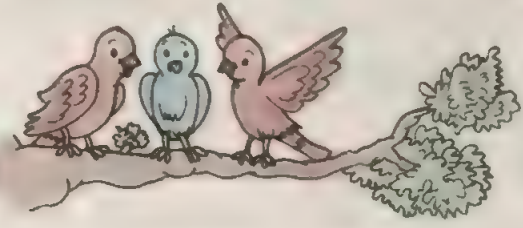
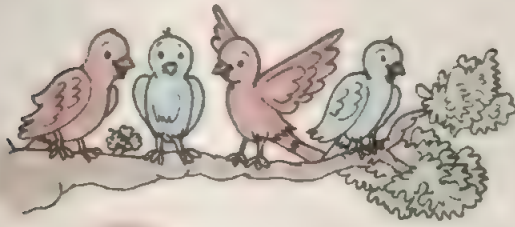
One juicy mango  
kept in a basket.  
If you pick and eat one  
how many will be left?



Zero



Count and write the number of birds on the branch.



How many in the cage.



3 Mice



Mice



Mouse



Mice

How many balloons in the hand.



3 Balloons



Balloons



Balloon



Balloons






## Addition

### One more



One little parrot,  
singing I love you,  
One more joins in,  
making them two.

Two little parrots,  
resting on a tree,  
One more joins in,  
making them three.



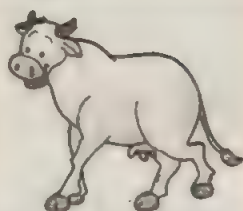
Four little parrots,  
wanting to dive,  
One more joins in,  
making them five.



Three little parrots,  
looking for more,  
One more joins in,  
making them four.



How many altogether ?



2 cows and

1 cow

is equal to

3 cows



3 children and

2 children is equal to

5 children



Flowers and

Flowers

=

Flowers



Birds and

Birds

=

Birds

How many altogether?



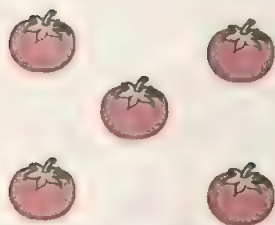
6

and

2

=

8



and

=



and

=



and

=





How many altogether?



4

+

3

=

7



+

=

54



+

=



# Addition



$$2 + 3 = 5$$



2

+ 3

5

$$4 + 2 =$$

$$5 + 1 =$$

$$3 + 6 =$$

$$7 + 0 =$$

$$0 + 9 =$$

4

+ 2

5

+ 1

3

+ 6

7

+ 0

0

+ 9





# Addition



$$3 + 2 = \boxed{5} \text{ balloons}$$



$$3 + 0 = \boxed{3} \text{ balloons}$$



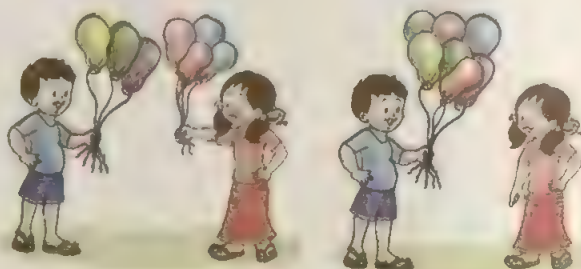
$$0 + 2 = \boxed{\phantom{00}}$$



$$4 + 0 = \boxed{\phantom{00}}$$



$$5 + 0 = \boxed{\phantom{00}}$$

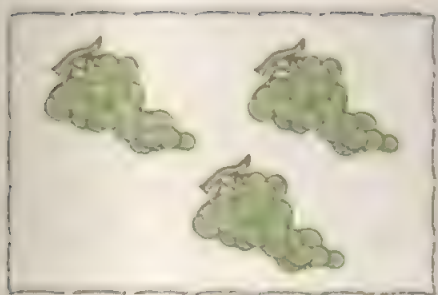


$$3 + 4 = \boxed{\phantom{00}}$$



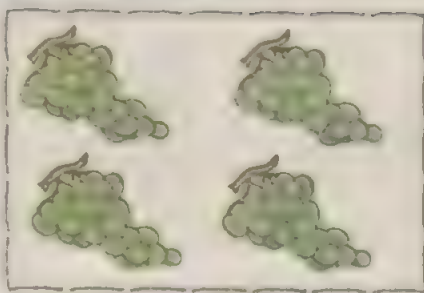


# Addition



3

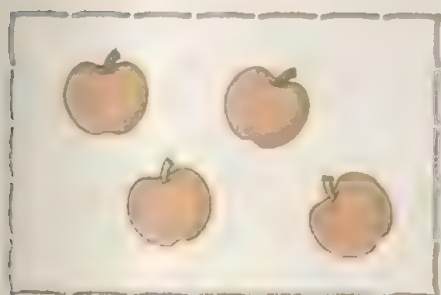
+



4

=

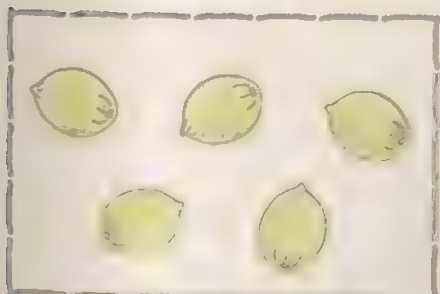
7



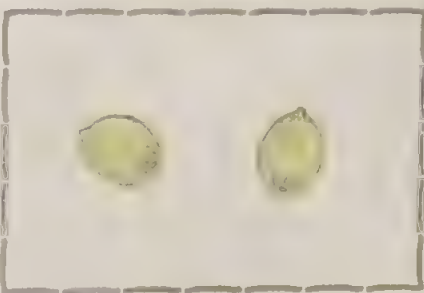
+



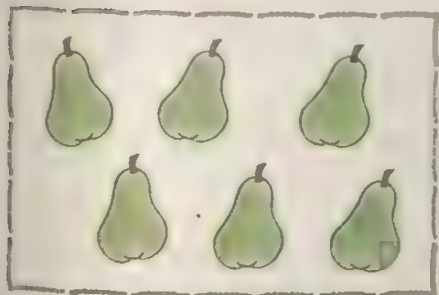
=



+



=



+



=





# Add and Match

$3 + 2$



$3 + 3$

$4 + 2$



$2 + 3$

$3 + 4$



$0 + 8$

$8 + 0$



$3 + 6$

$6 + 3$



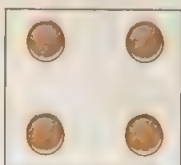
$5 + 2$

$2 + 1$



$1 + 2$

$1 + 3$



$3 + 1$



Add

$2 + 7 =$

$3 + 5 =$

$4 + 0 =$

$2 + 2 =$



$1 + 3 =$

$4 + 1 =$

$0 + 2 =$

$3 + 4 =$

$$\begin{array}{r} 3 \\ + 6 \\ \hline \end{array}$$

$$\begin{array}{r} 5 \\ + 2 \\ \hline \end{array}$$

$$\begin{array}{r} 3 \\ + 3 \\ \hline \end{array}$$

$$\begin{array}{r} 0 \\ + 8 \\ \hline \end{array}$$

$$\begin{array}{r} 6 \\ + 3 \\ \hline \end{array}$$

$$\begin{array}{r} 1 \\ + 7 \\ \hline \end{array}$$

$$\begin{array}{r} 2 \\ + 3 \\ \hline \end{array}$$

$$\begin{array}{r} 5 \\ + 0 \\ \hline \end{array}$$

$$\begin{array}{r} 3 \\ + 4 \\ \hline \end{array}$$







Write the missing numerals

$$\square + \square = 5$$

$$\square + \square = 6$$

$$\square + \square = 7$$

$$\square + \square = 3$$

$$\square + \square = 4$$

$$\square + \square = 9$$

$$\square + \square = 8$$

$$\square + \square = 1$$



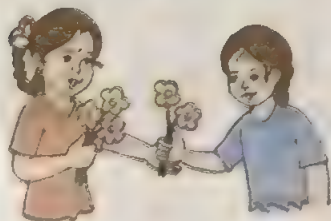


# Subtraction

Take Away



5

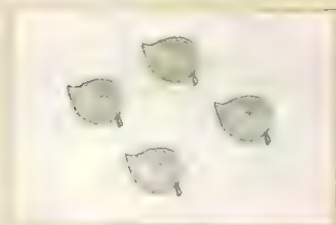


Take away

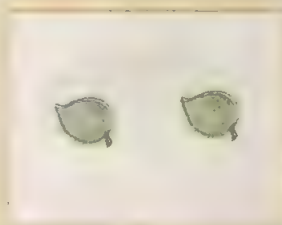
2



Left 3



4



Take away

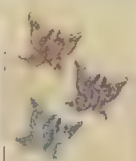
2



Left



Take away



Left



Take Away



Left





## Subtraction



6

—



4

=



2



5

—



2

=



9

—



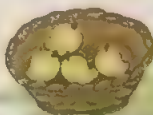
4

=



5

—



1

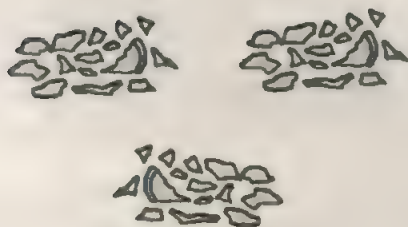
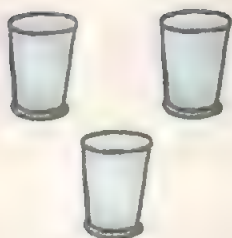
=







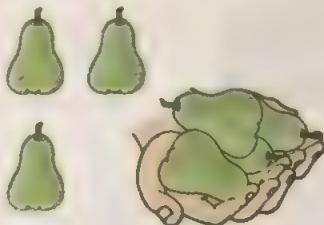
# Subtraction



-



=



-



=



-



=



-



=

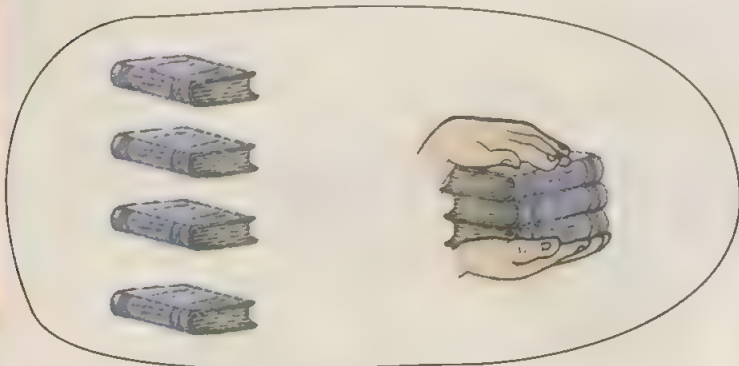




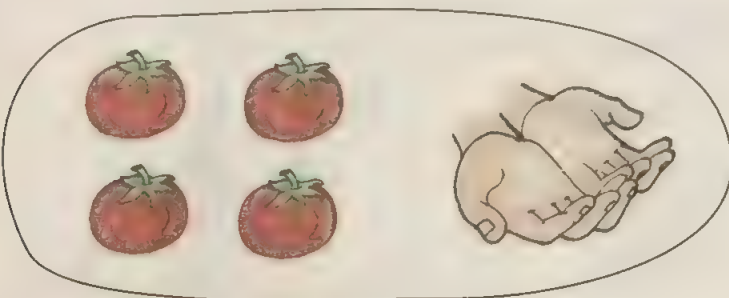
# Subtraction



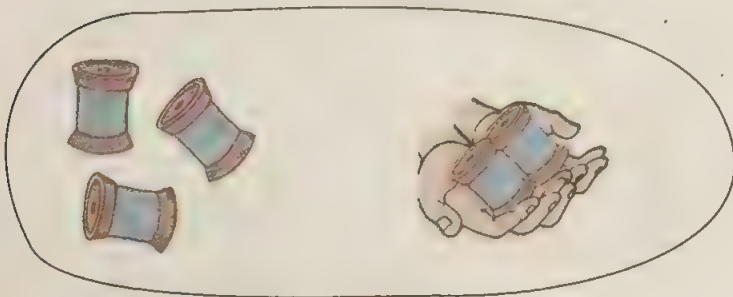
$$3 - 1 = 2$$



$$\square - \square = \square$$



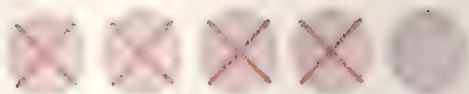
$$\square - \square = \square$$



$$\square - \square = \square$$



# Subtraction



$5 - 4 = 1$

$$\begin{array}{r} 5 \\ - 4 \\ \hline 1 \end{array}$$



$6 - 2 = \square$

$$\begin{array}{r} 6 \\ - 2 \\ \hline \end{array}$$



$9 - 5 = \square$

$$\begin{array}{r} 9 \\ - 5 \\ \hline \end{array}$$



$4 - 4 = \square$

$$\begin{array}{r} 4 \\ - 4 \\ \hline \end{array}$$



$8 - 3 = \square$

$$\begin{array}{r} 8 \\ - 3 \\ \hline \end{array}$$







## Subtract and Match

$4 - 2$

3

$9 - 5$

$7 - 2$

4

$8 - 2$

$9 - 1$

2

$7 - 4$

$5 - 1$

5

$8 - 0$

$6 - 3$

6

$5 - 3$

$7 - 1$

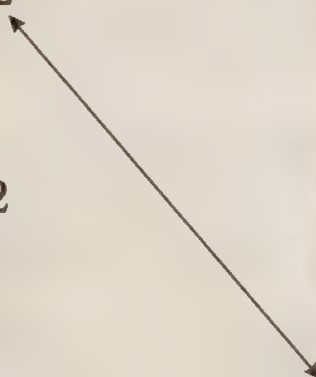
8

$8 - 3$

$5 - 0$

0

$7 - 7$





## Subtract

$4 - 2 = 2$

$4 - 0 =$

$5 - 2 =$

$6 - 5 =$

$7 - 7 =$

$8 - 4 =$

$3 - 1 =$



$$\begin{array}{r} 2 \\ - 0 \\ \hline 2 \end{array}$$

$$\begin{array}{r} 9 \\ - 7 \\ \hline \end{array}$$

$$\begin{array}{r} 3 \\ - 0 \\ \hline \end{array}$$

$$\begin{array}{r} 8 \\ - 8 \\ \hline \end{array}$$

$$\begin{array}{r} 6 \\ - 4 \\ \hline \end{array}$$

$$\begin{array}{r} 4 \\ - 2 \\ \hline \end{array}$$





Write the missing numbers

$$8 - \square = 7$$

$$\square - 2 = 3$$

$$5 - \square = 1$$

$$\square - 3 = 5$$

$$3 - \square = 3$$

$$\square - 2 = 0$$

$$9 - 2 = \square$$

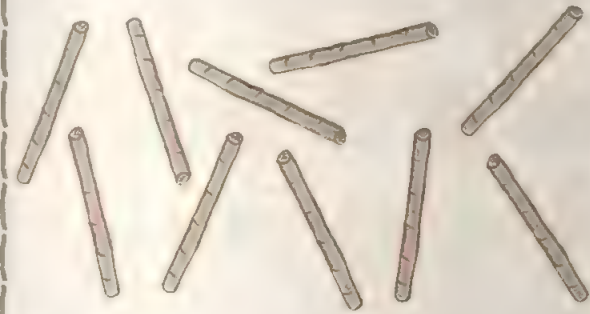
$$\square - 2 = 7$$



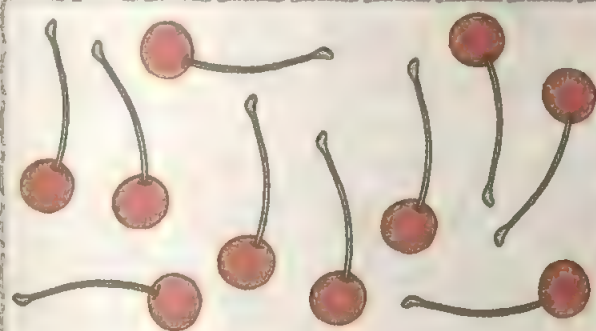




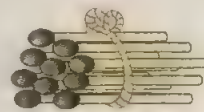
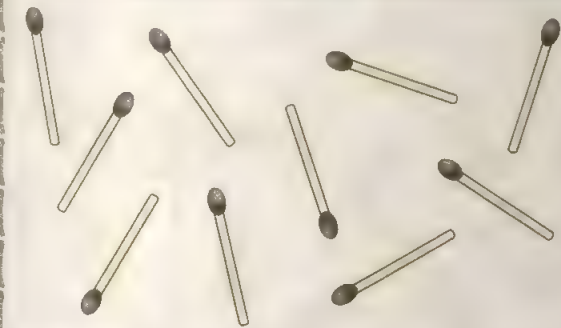
## Numbers from Ten to Twenty



a bundle of TEN



a bundle of TEN



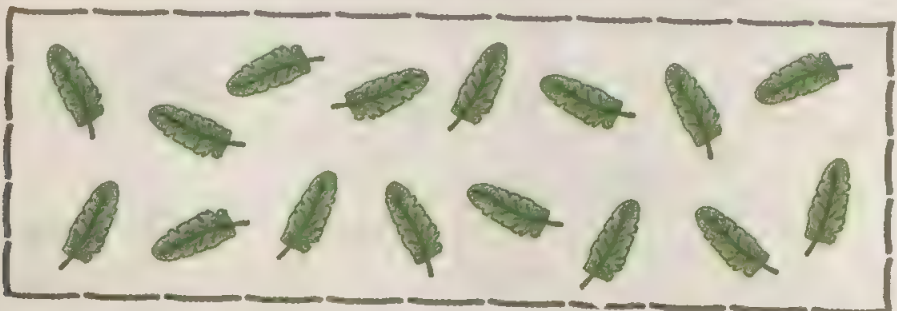
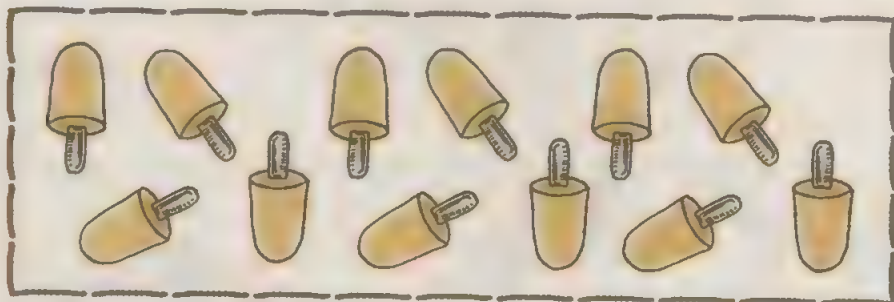
a bundle of TEN



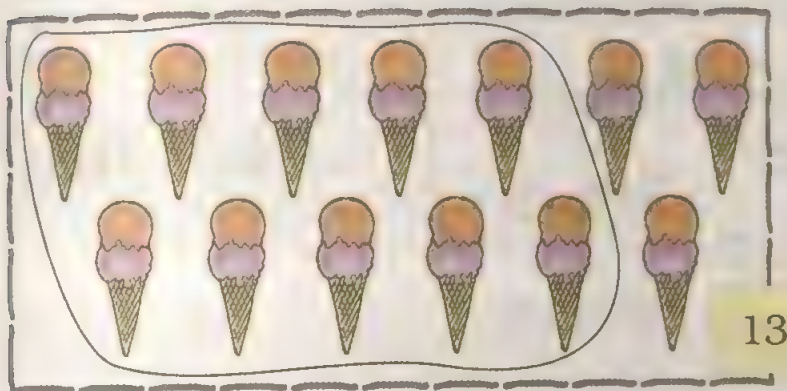
a bundle of TEN



Make a group of 10.

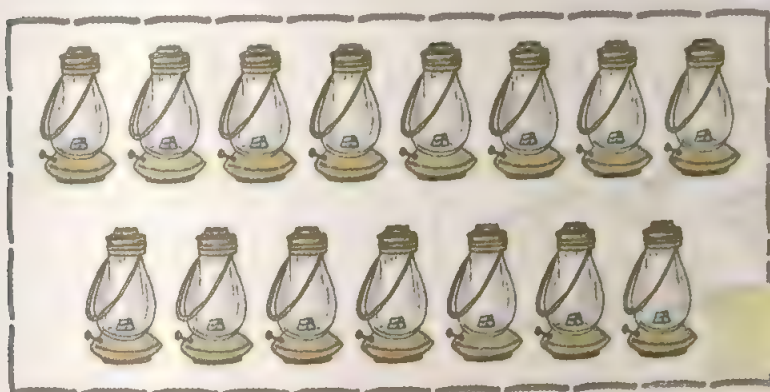


Make a group of 10 and write numbers.



Ten	Ones
1	3

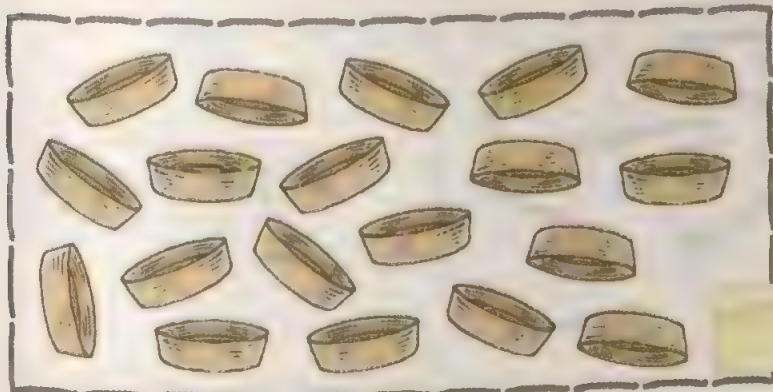
13



Ten	Ones



Ten	Ones

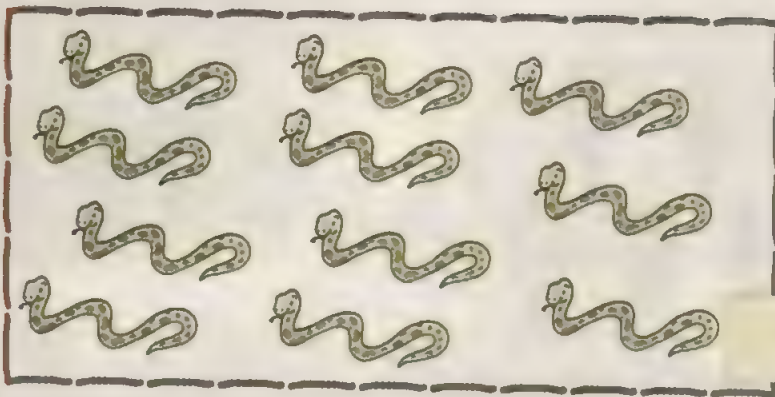


Ten	Ones





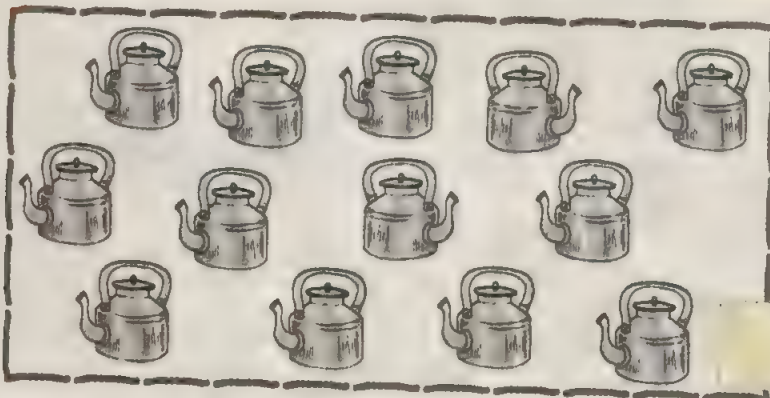
Make a group of 10.



Ten	Ones



Ten	Ones



Ten	Ones



Ten	Ones



## Counting from 10 to 20

Fill in the blanks.



$$9 + 1 = 10$$



$$10 + 1 = \bigcirc$$



$$10 + 2 = 12$$



$$10 + 3 = \bigcirc$$



$$10 + 4 = 14$$

Fill in the blanks.



10

+



5

=



15



10

+



6

=



10

+

7

=



17



10

+



8

=



10

+



9

=



19



10

+



10

=



20





Complete the table



$$= 10$$

1 ten

10	10			



$$= 11$$

1 ten

1 one

11	11			



$$= 12$$

1 ten

2 ones

12	12			





# Complete the table



1 ten



3 ones

$$= 13$$

13	13			



1 ten



4 ones

$$= 14$$

14	14			



1 ten



5 ones

$$= 15$$

15	15			



Complete the table



1 ten



6 ones

$$= 16$$

16	16			



1 ten



7 ones

$$= 17$$

17	17			



1 ten



8 ones

$$= 18$$

18	18			







Complete the table



1 ten



9 ones

= 19

19	19			



1 ten



1 ten

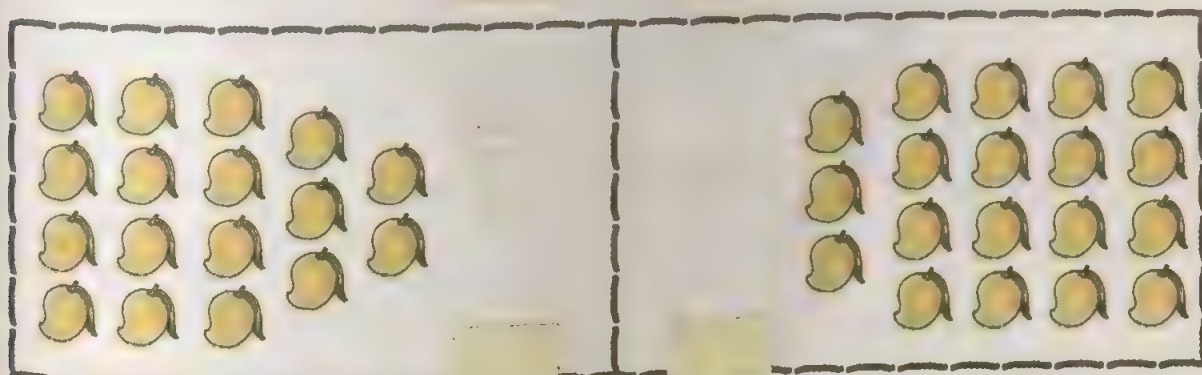
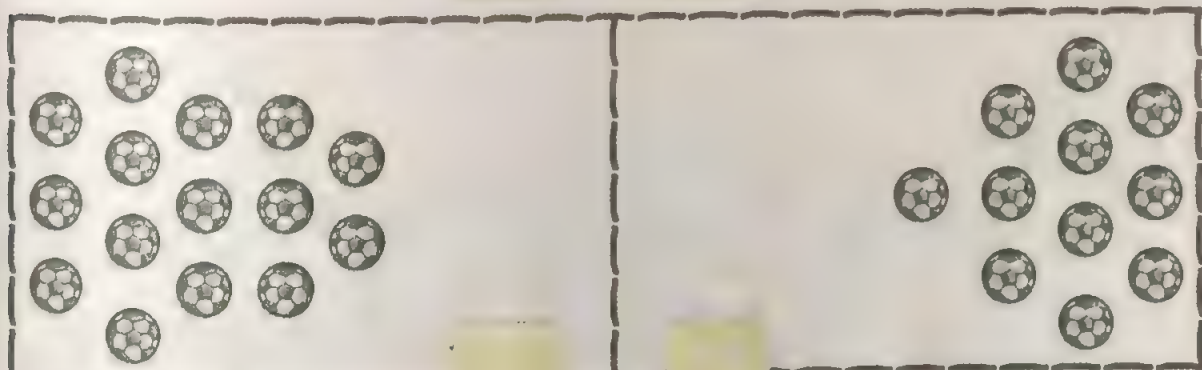
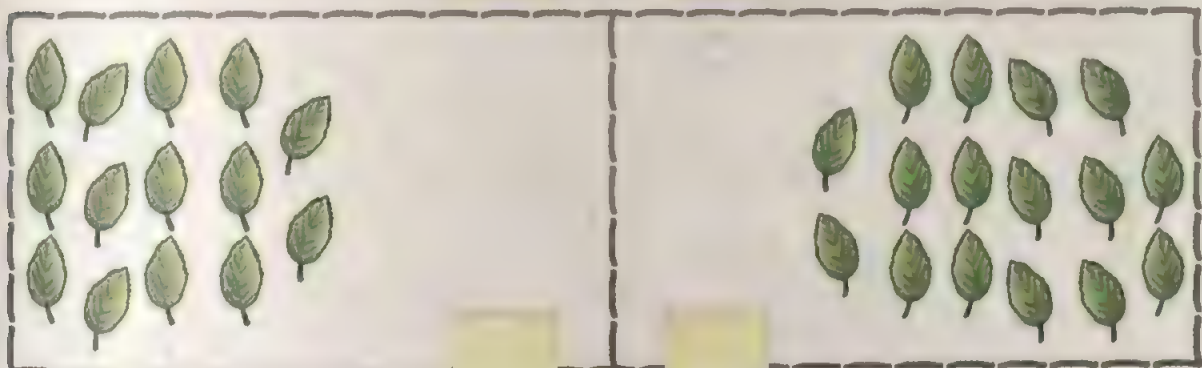
= 20

2 tens

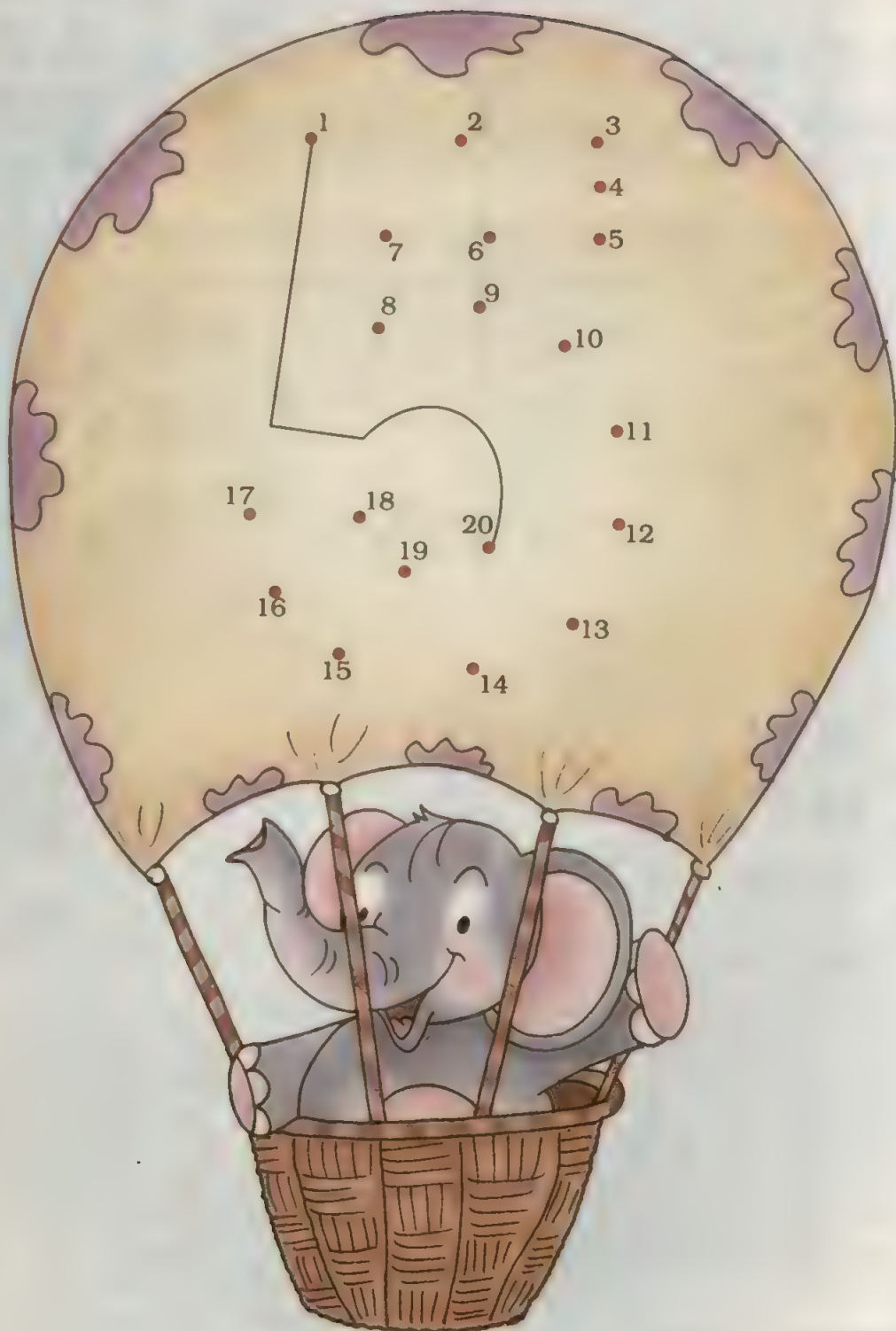
20	20			



Tick(✓) the group with more objects.



Join in order.





Write the **missing** numbers.

10		12			15					
----	--	----	--	--	----	--	--	--	--	--

16		18
----	--	----

13		15
----	--	----

What comes after 18?

18		
----	--	--

What comes after 14?

14		
----	--	--

What comes before 16?

	16	17
--	----	----

Write numbers before and after 9?

	9	
--	---	--

Write numbers before and after 18?

	18	
--	----	--

Write numbers before and after 10?

	10	
--	----	--





Circle the bigger number.

11

13

13

15

18

8

12

8

17

7

11

10

16

6

1

11

9

19

82

Circle the smaller number.

20

10

6

4

10

12

11

9

5

15

12

2

16

17

9

10

15

13

Circle the **biggest** number.

13

3

9

12

15

20

10

5

12

11

12

13

19

18

17

13

16

14

Circle the **smallest** number.

7

2

4

14

16

12

15

7

20

19

8

9

1

10

20

16

15

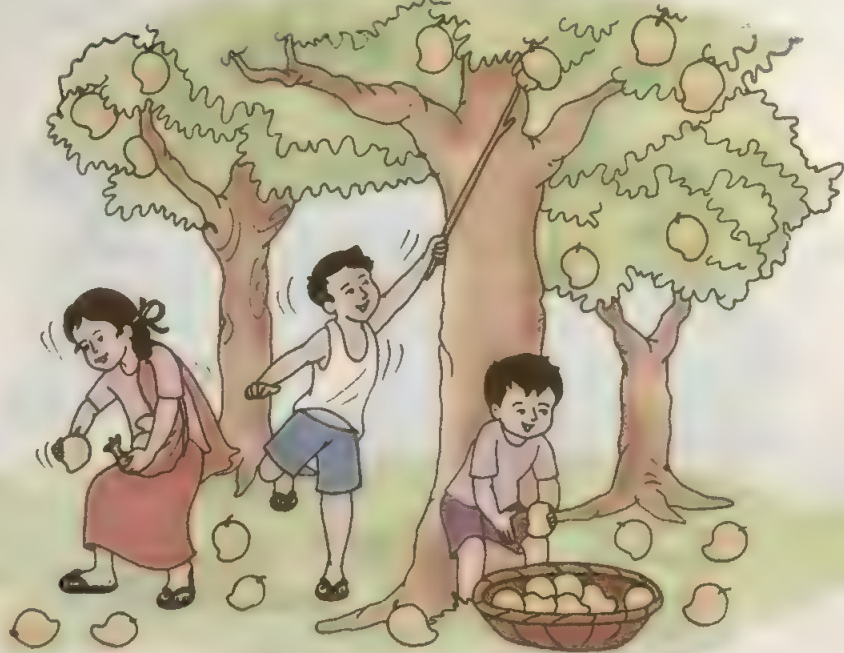
14







## Addition



$4 + 5 =$



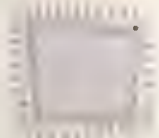
$0 + 3 =$



$5 + 2 =$



$6 + 2 =$



$$\begin{array}{r} 6 \\ + 2 \\ \hline \end{array}$$

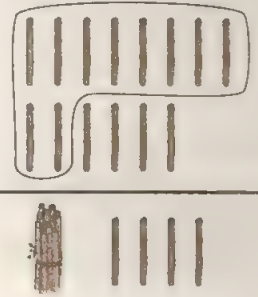
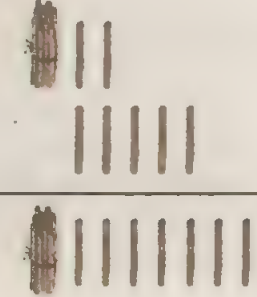


$$\begin{array}{r} 0 \\ + 5 \\ \hline \end{array}$$



$$\begin{array}{r} 1 \\ + 7 \\ \hline \end{array}$$



$\begin{array}{r} 8 \\ + 6 \\ \hline 14 \end{array}$ 	$\begin{array}{r} 12 \\ + 5 \\ \hline 17 \end{array}$ 
--	--

$8 + 7 =$

$11 + 15 =$

$9 + 9 =$

$4 + 12 =$

$8 + 5 =$

$13 + 5 =$

$6 + 7 =$

$0 + 14 =$

$$\begin{array}{r} 5 \\ + 9 \\ \hline \end{array}$$

$$\begin{array}{r} 7 \\ + 8 \\ \hline \end{array}$$

$$\begin{array}{r} 5 \\ + 5 \\ \hline \end{array}$$

$$\begin{array}{r} 12 \\ + 7 \\ \hline \end{array}$$

1. Rahul has 8 pencils. Sonu has 7 pencils.  
How many pencils do they have altogether?
2. Farida plucked 4 apples. Sita plucked 6 apples.  
Both put them together. How many apples are there now?



## Subtraction

$7 - 4 =$

$9 - 8 =$

$2 - 2 =$

$6 - 2 =$

$$\begin{array}{r} 8 \\ - 4 \\ \hline \end{array}$$

$$\begin{array}{r} 6 \\ - 5 \\ \hline \end{array}$$

$$\begin{array}{r} 4 \\ - 0 \\ \hline \end{array}$$

$$\begin{array}{r} 17 \\ - 5 \\ \hline 12 \end{array}$$



$15 - 4 =$

$17 - 2 =$

$19 - 7 =$

$12 - 1 =$



$18 - 8 =$

$14 - 3 =$

$17 - 5 =$

$12 - 4 =$

$11 - 1 =$

$13 - 0 =$

$$\begin{array}{r} 17 \\ - 4 \\ \hline \end{array}$$

$$\begin{array}{r} 18 \\ - 3 \\ \hline \end{array}$$

$$\begin{array}{r} 15 \\ - 5 \\ \hline \end{array}$$

$$\begin{array}{r} 19 \\ - 8 \\ \hline \end{array}$$

$$\begin{array}{r} 14 \\ - 4 \\ \hline \end{array}$$

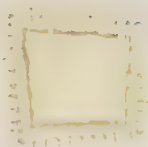
$$\begin{array}{r} 13 \\ - 6 \\ \hline \end{array}$$

1. Sohan's mother brought 9 bananas from the market. She gave 4 bananas to Sohan. How many bananas was she left with?

2. Rahim had 8 flowers. He put three flowers in a vase. How many flowers was he left with?

Addition practice.

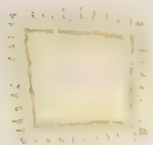
$3 + 7 =$



$7 + 6 =$



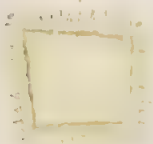
$5 + 8 =$



$9 + 2 =$



$6 + 8 =$



$8 + 7 =$



$9 + 9 =$



$4 + 8 =$

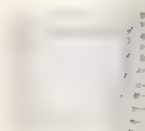


Subtraction practice.

$13 - 7 =$



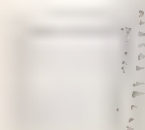
$16 - 6 =$



$15 - 3 =$



$12 - 0 =$



$19 - 6 =$



$14 - 3 =$



$17 - 4 =$



$18 - 7 =$





Time

### Sampada's Day



1. Get up for school



2. Eat breakfast



3. Read a story in school



4. Eat lunch



5. Play



6. Study



7. Go to bed





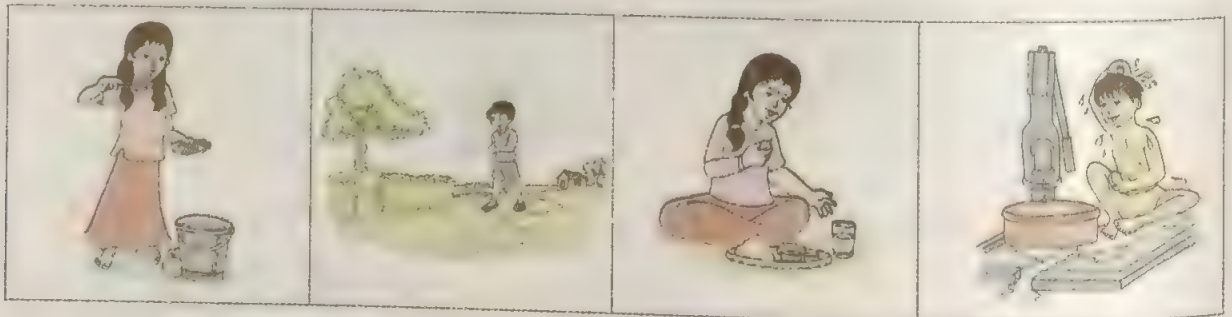
Tick(✓) the activities that you do in the morning.



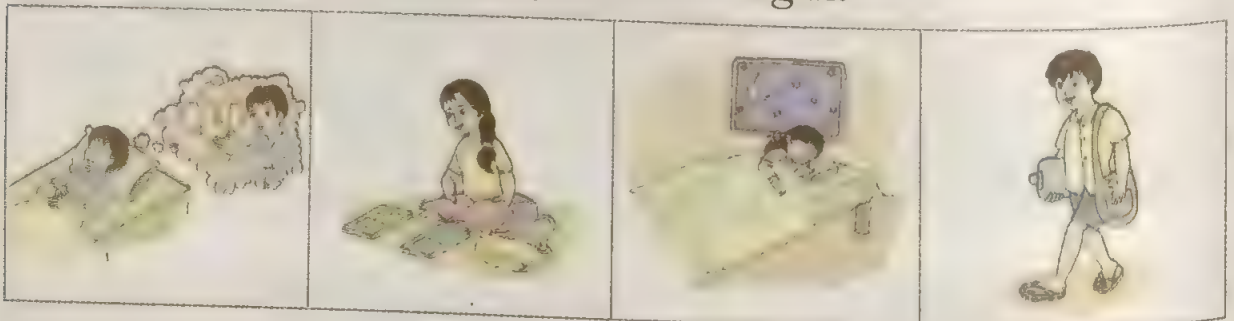
Tick(✓) the activities that you do in the evening.



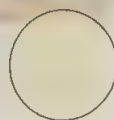
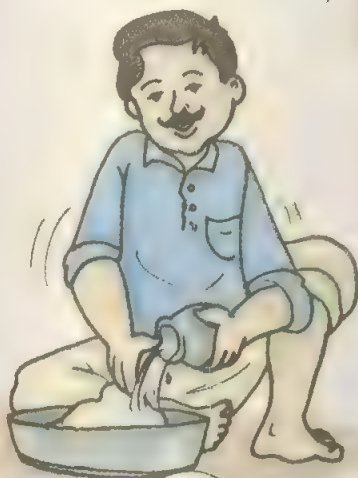
Tick(✓) the activities that you do in the day.



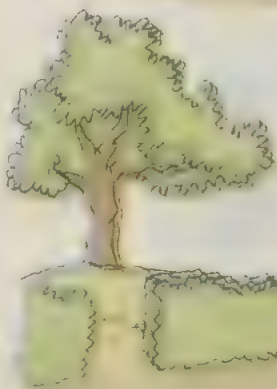
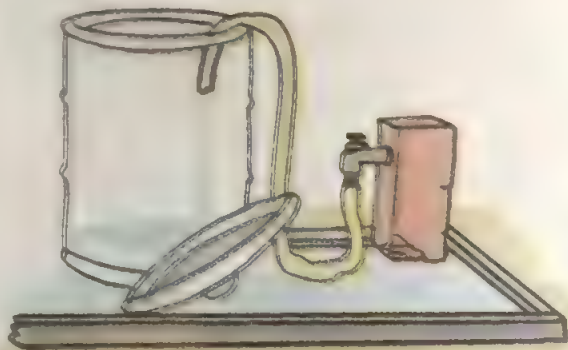
Tick(✓) the activities that you do at night.



Number the activities in sequence.



Tick (✓) the activity that will take longer.

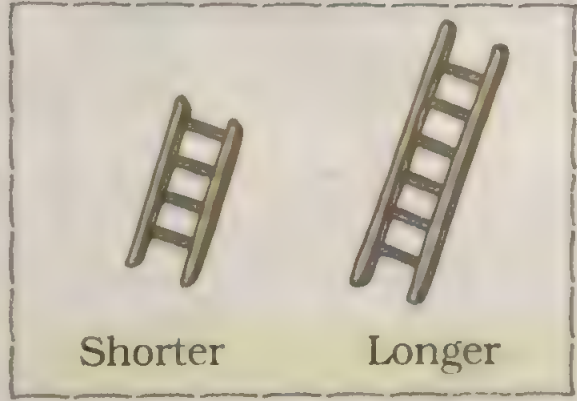
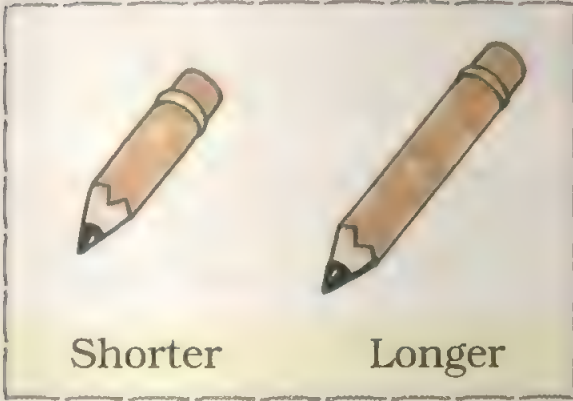




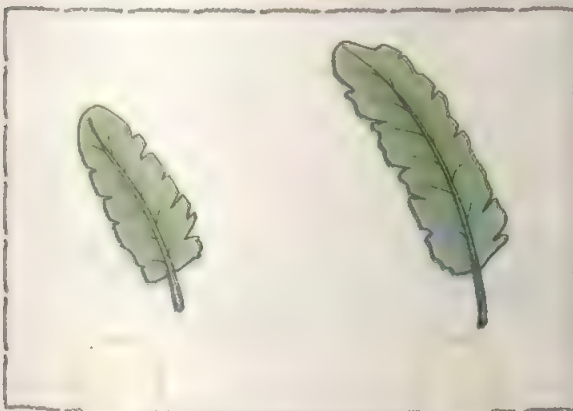


# Measurement

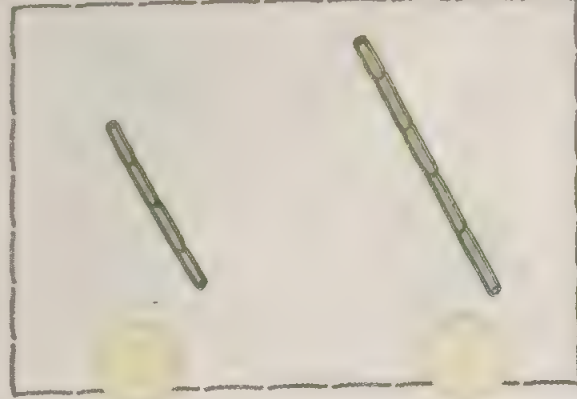
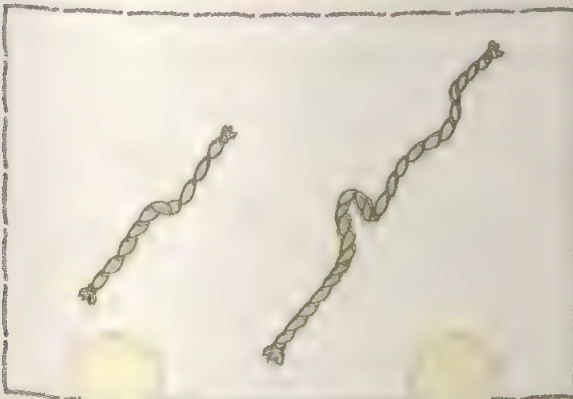
## Longer – Shorter



Tick ( ) the Longer.



Tick ( ) the Shorter.

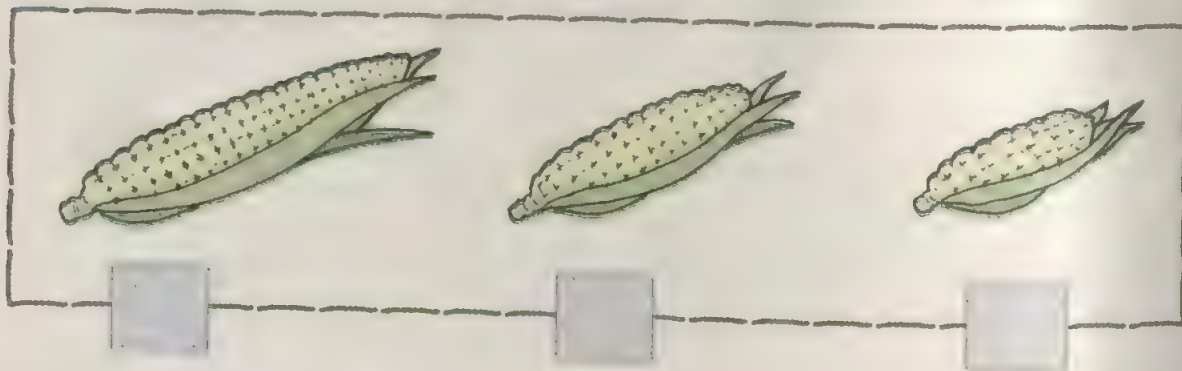
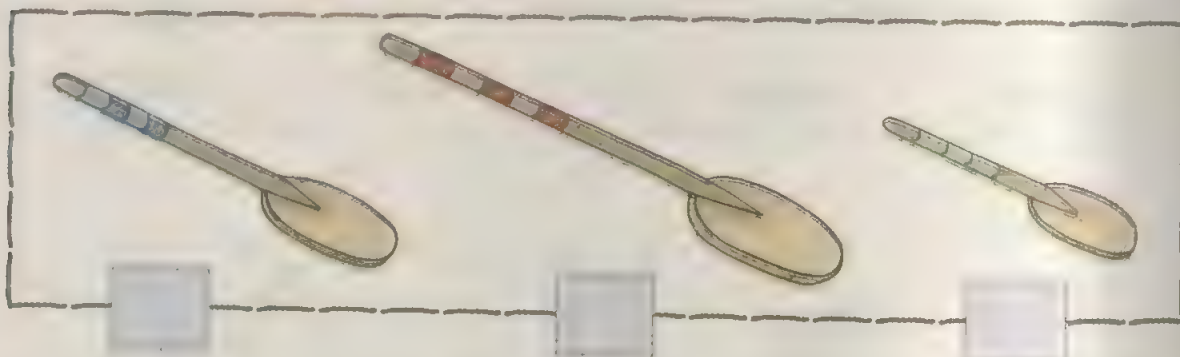




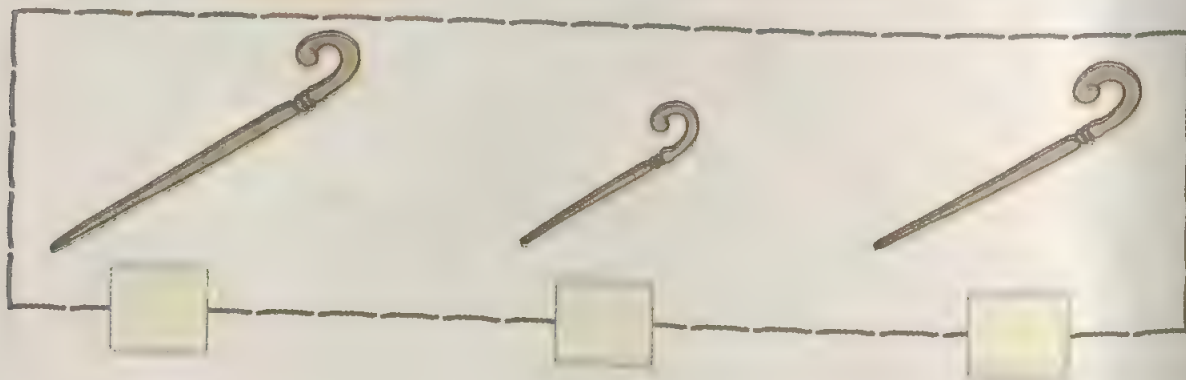
## Longest - Shortest



Tick (✓) the Longest.

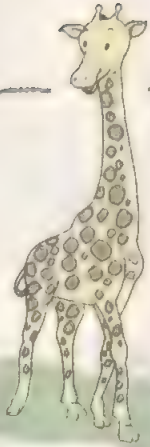


Tick (✓) the Shortest.





## Taller - Shorter



Taller



Shorter

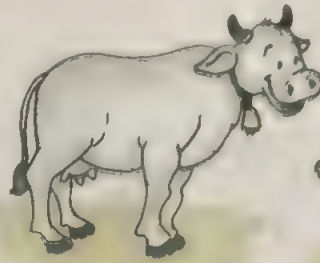


Taller



Shorter

Tick (✓) the **Taller**.



Tick (✓) the **Shorter**.







## Tallest - Shortest



Tallest



Shortest



Tallest



Shortest

Tick (✓) the Tallest.



Tick (✓) the Shortest.

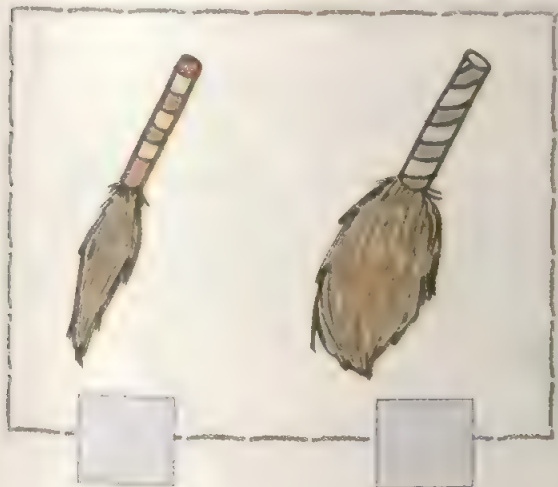




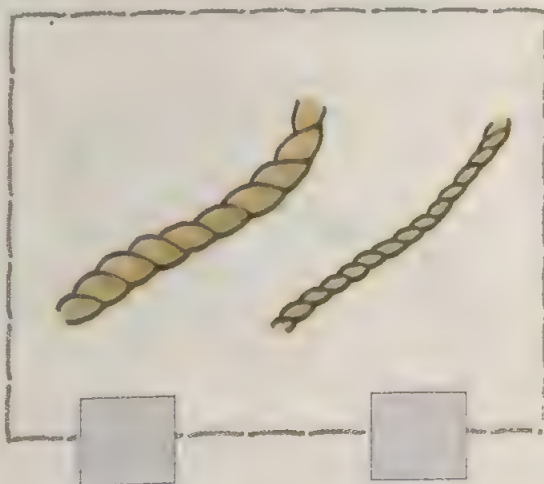
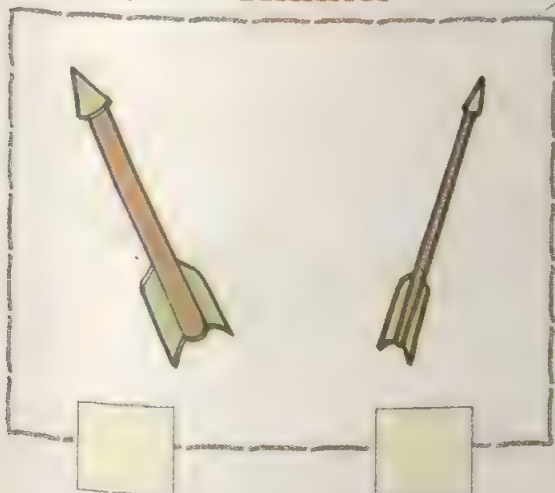
## Thicker - Thinner



Tick (✓) the **Thicker**.



Tick (✓) the **Thinner**.

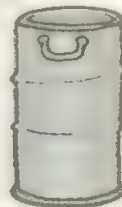
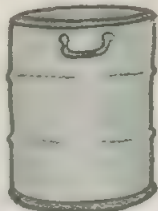




## Thickest - Thinnest



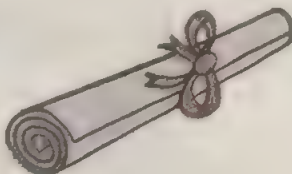
Thickest



Thinnest



Thickest

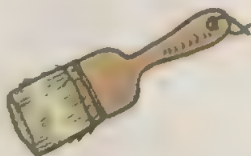


Thinnest

Tick (✓) the **Thickest**.

☐☐☐

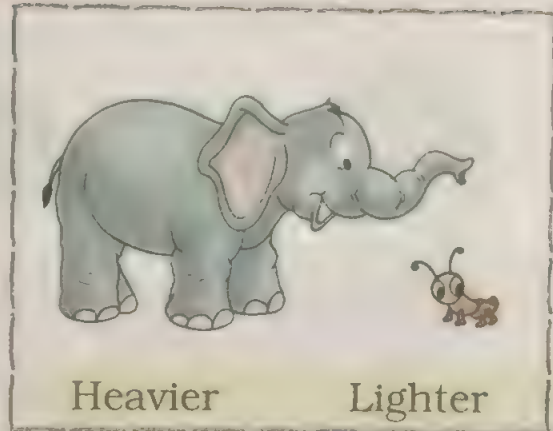
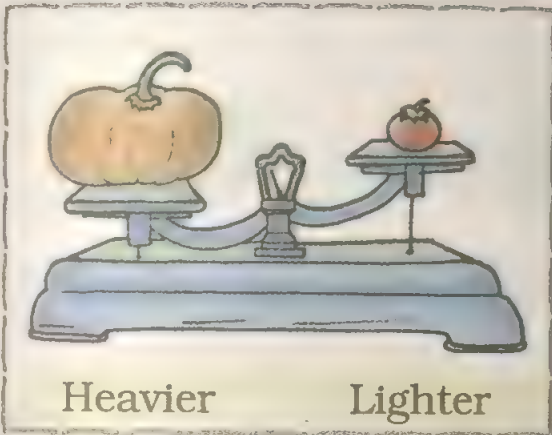
Tick (✓) the **Thinnest**.

☐☐☐

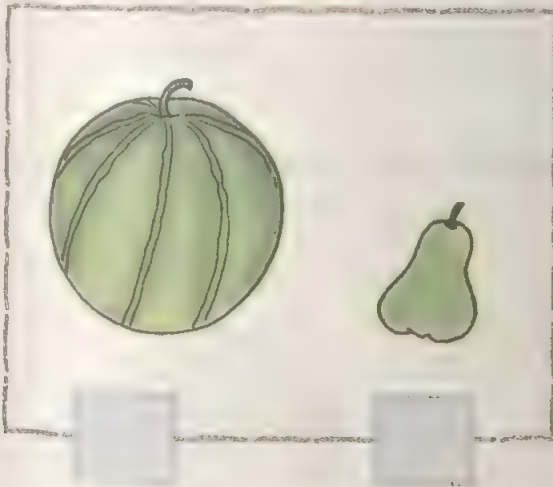




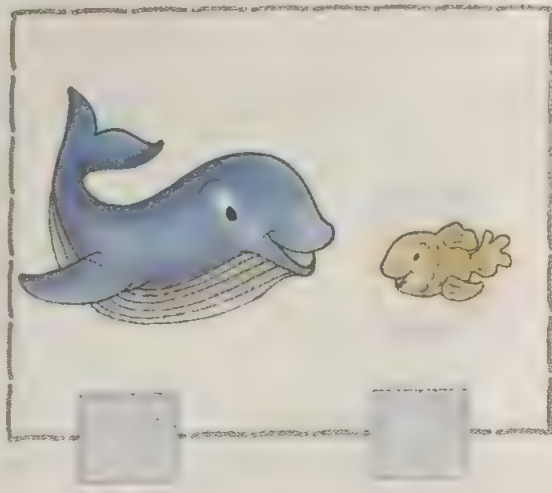
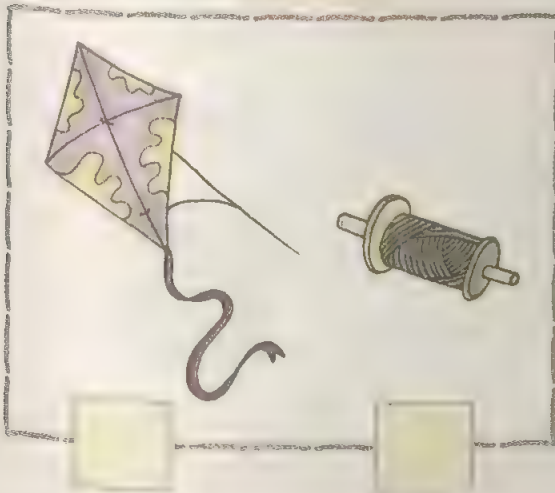
## Heavier - Lighter



Tick (✓) the lighter.



Tick (✓) the Heavier.

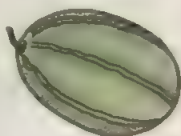




## Heaviest - Lightest

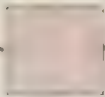


Heaviest

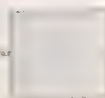


Lightest

Tick (✓) the Heaviest.



Tick (✓) the Lightest.



Tick (✓) the Heaviest.





## Measurement



The book is  spans long.



The table is  spans long.

Trace your friends hand span here.



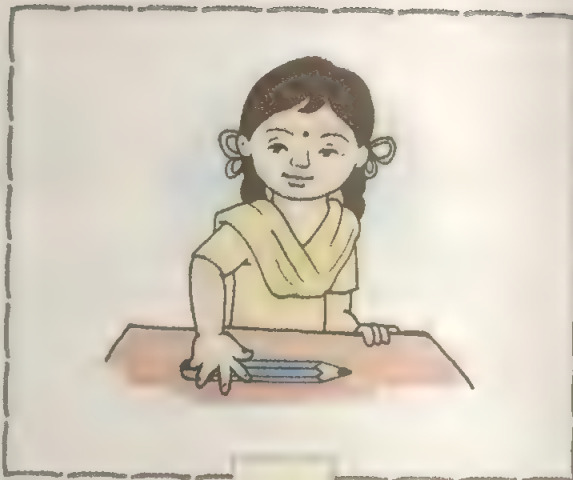




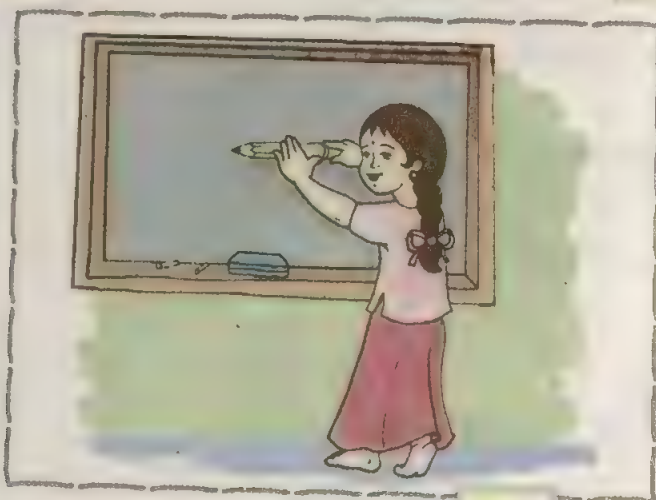
## Measure



My table is  span long.



My pencil is  span long.



My classroom blackboard is  pencils long.





The carpet is 10 feet long.

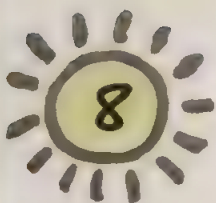


The mat is 6 feet long.



Guess the distance.





# Numbers from Twenty-one to Fifty

Fill in the blanks.



18









Write the number.

Draw the bundles and ones.



TEN



ONES

TEN	ONES
1	4


14

TEN


ONES

TEN	ONES
1	5

15



TEN



ONES


TEN	ONES

TENS


ONES

TENS	ONES
2	0

20



TEN



ONES

TEN	ONES

TENS

ONES

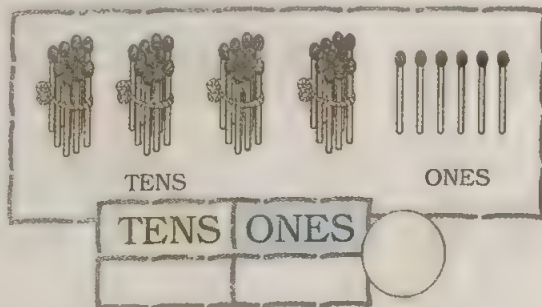
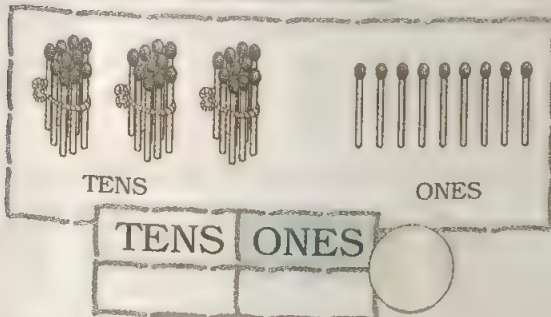
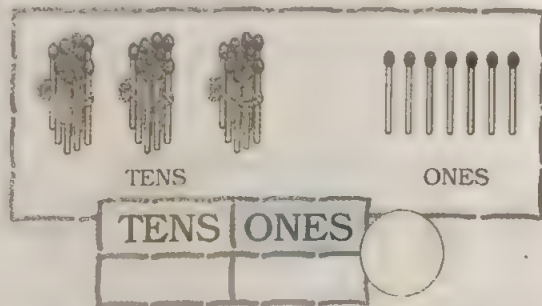
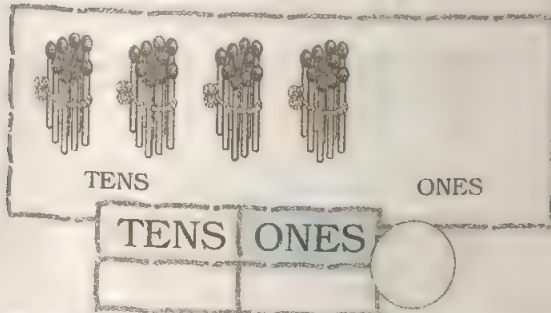
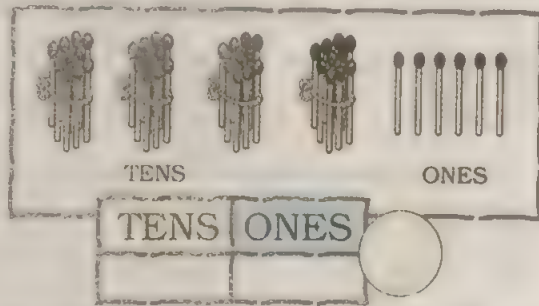
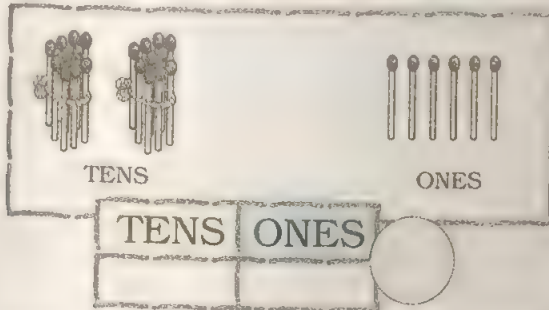
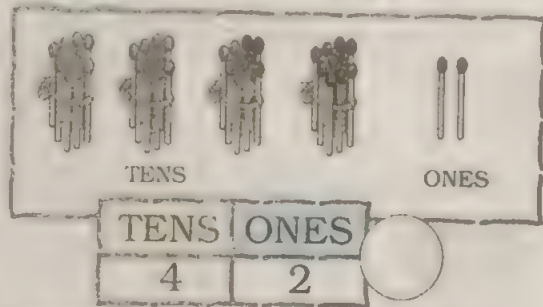
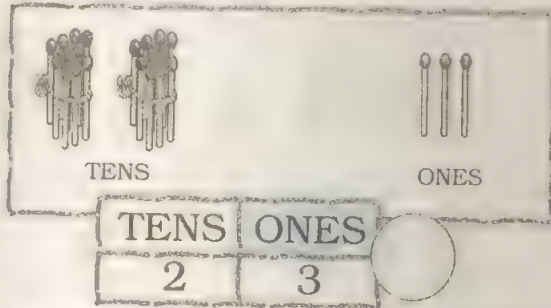
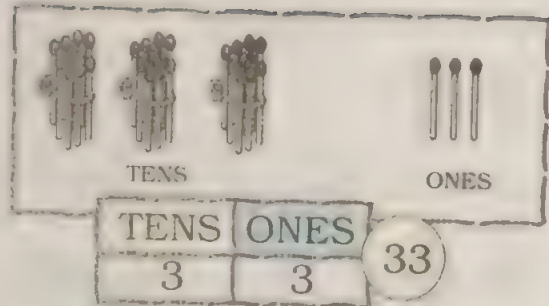
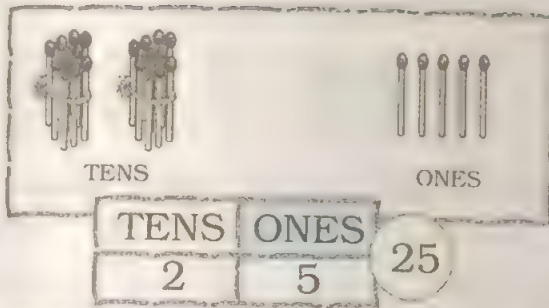
TENS	ONES
2	2

22





Write the number







## Numbers from 41 to 50

Fill in the blanks.

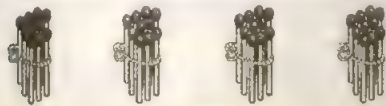


4 TENS



1 ONE

41



4 TENS

2 ONES

43



4 TENS

3 ONES

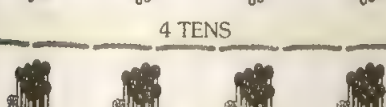
45



4 TENS

4 ONES

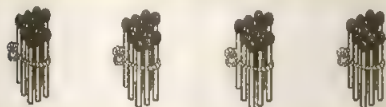
47



4 TENS

5 ONES

49



4 TENS

6 ONES

51



4 TENS

7 ONES

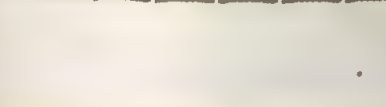
53



4 TENS

8 ONES

55



4 TENS

9 ONES

59



4 TENS



1 Ten

60



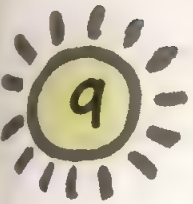




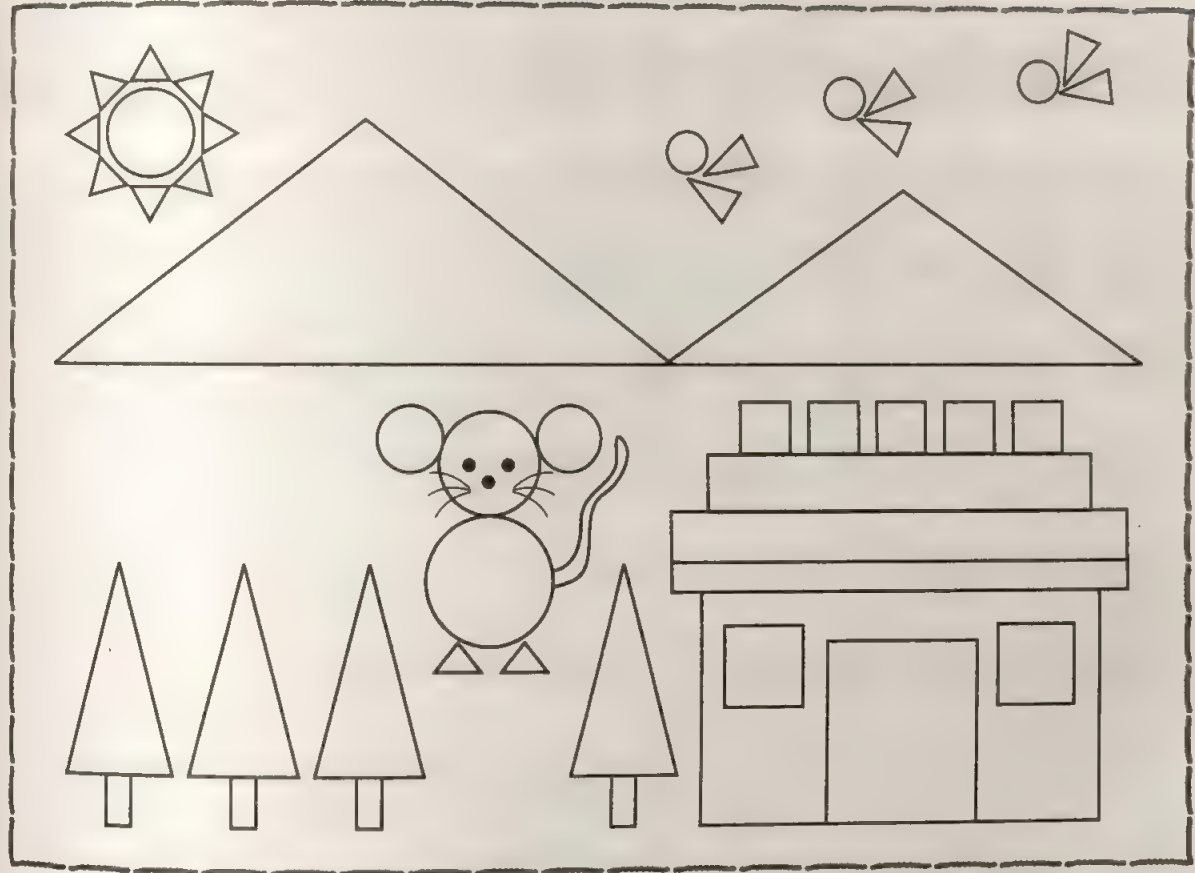
Write the missing numbers

1	2	3	4	5	6	7	8	9	10
11		13			16				
	22					27			
							38		
		43						49	

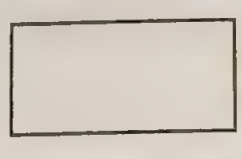
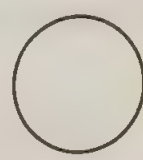




# Data Handling



Count the shapes in the above picture.



Name the shapes  
that occurs the most

that occurs the least



These children are friends.

Count the number of letters in each name-word.

Names	Number of letters
S A L M A	<input type="text"/>
J O S E P H	<input type="text"/>
A R U N	<input type="text"/>
C H I N T U	<input type="text"/>
G E E T A	<input type="text"/>
A S H A	<input type="text"/>
S U B B U	<input type="text"/>
A H M A D	<input type="text"/>
R A V I	<input type="text"/>

How many names have four letters

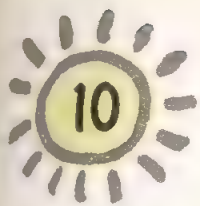
How many names have five letters

How many names have six letters

How many times **S** comes in all the names taken together

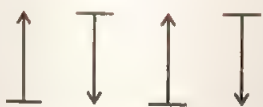
How many times **A** comes in all the names taken together



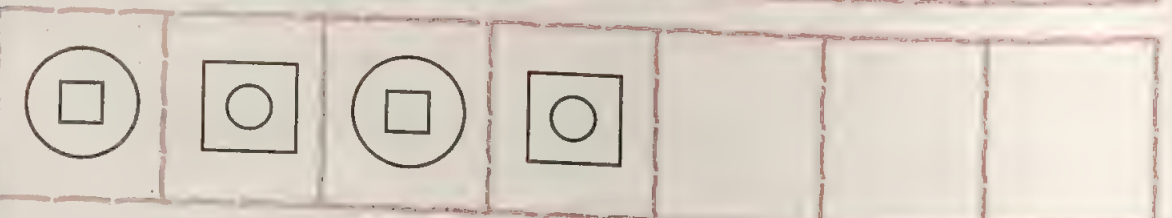
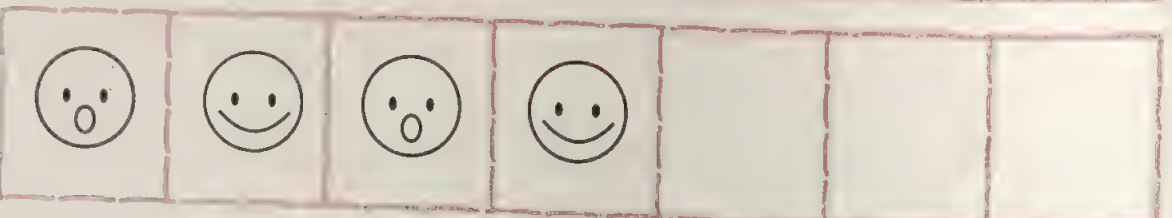
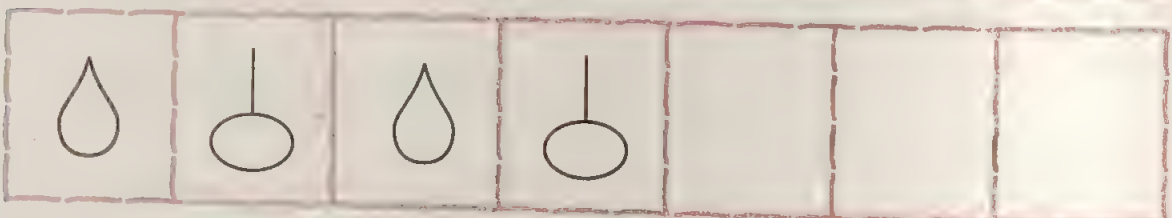
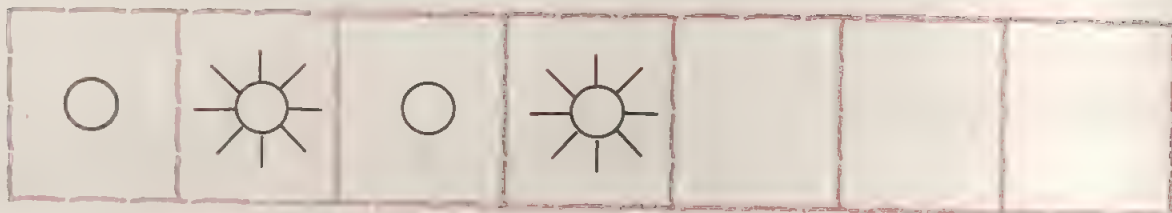


# Patterns

Extend the sequence.



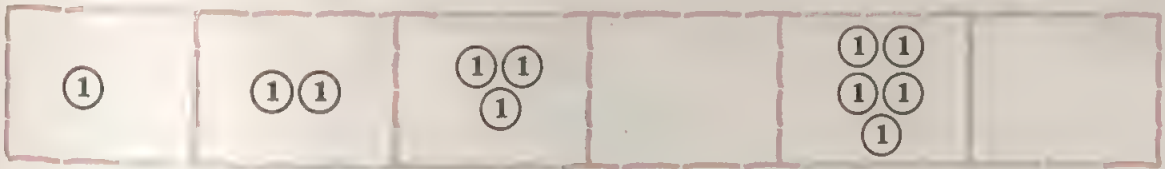
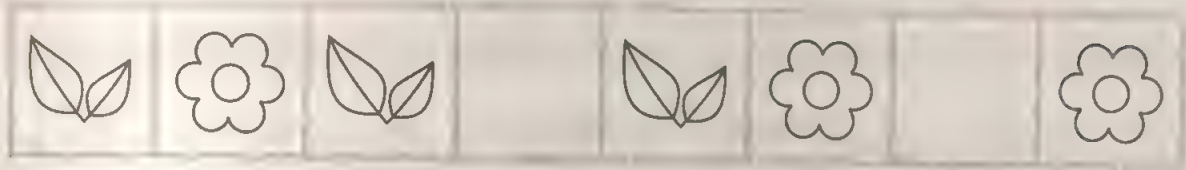
What comes next in the sequence ?





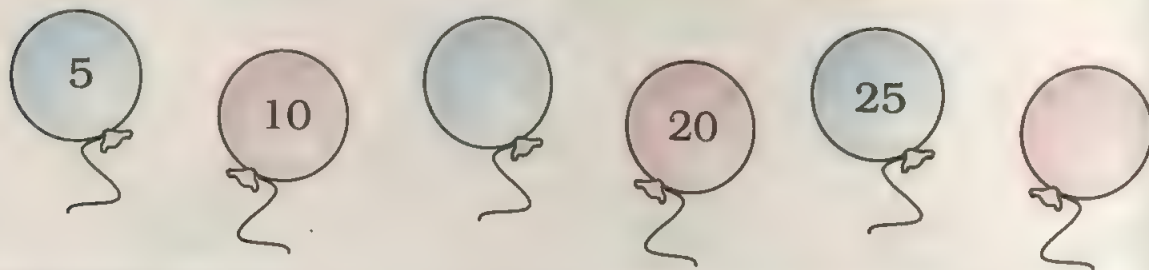
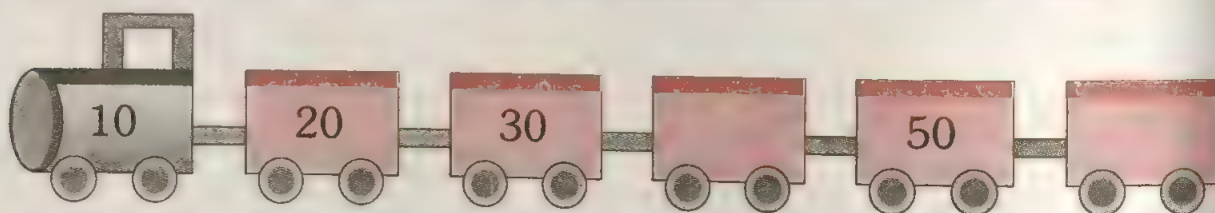
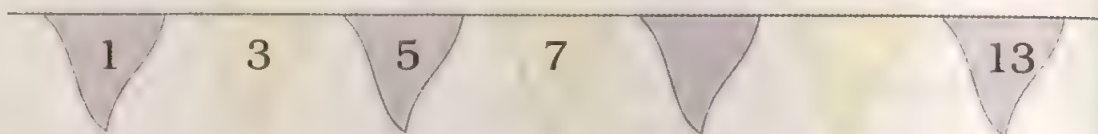
## Patterns in shape

Fill in the boxes in sequence.







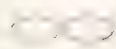












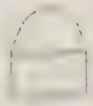





Study the pattern and fill in the missing numbers.

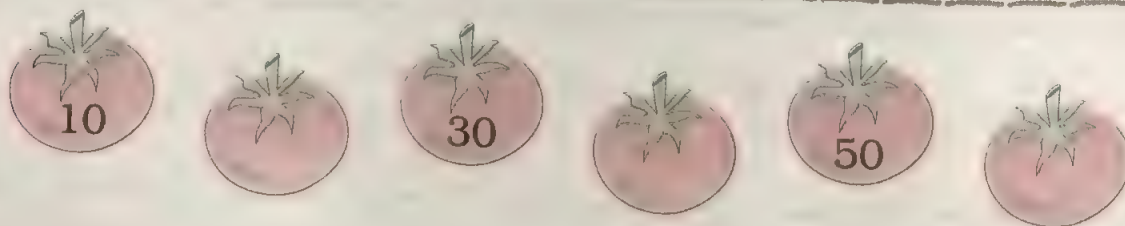
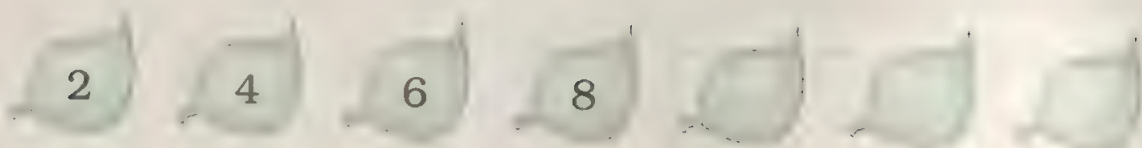


Complete the pattern.



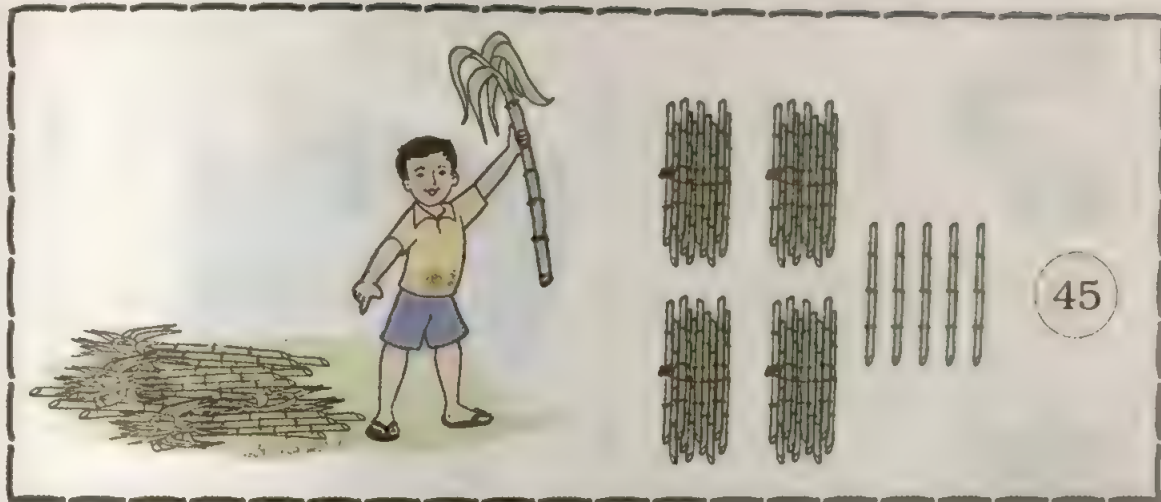
Complete the pattern.



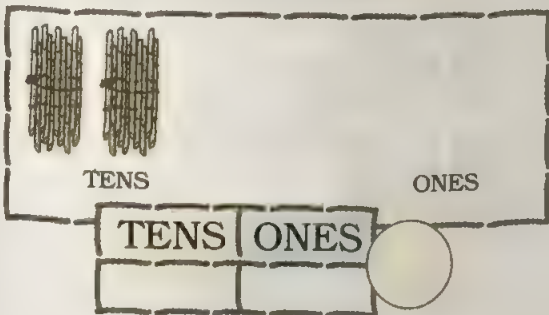
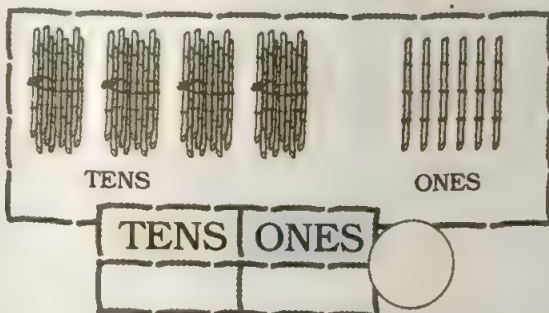
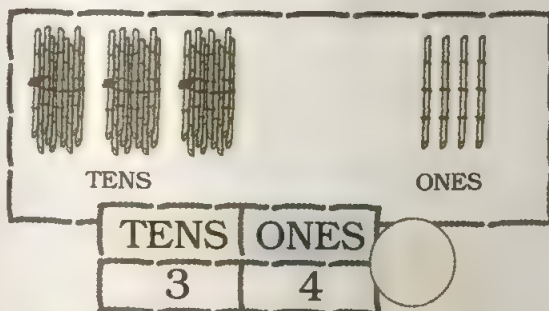




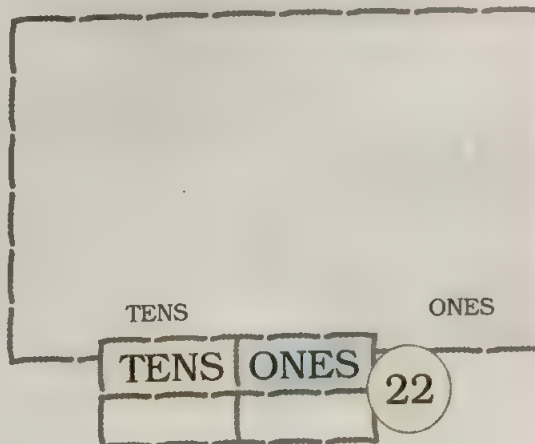
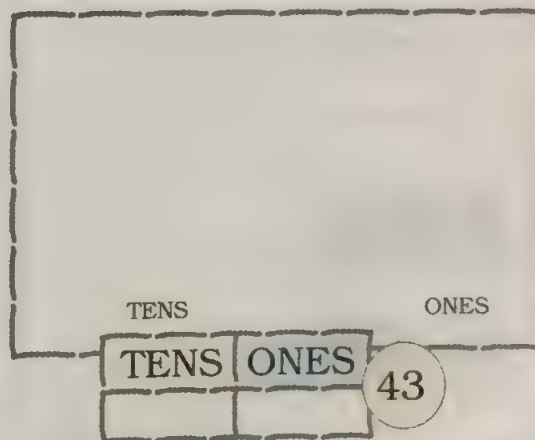
# Numbers



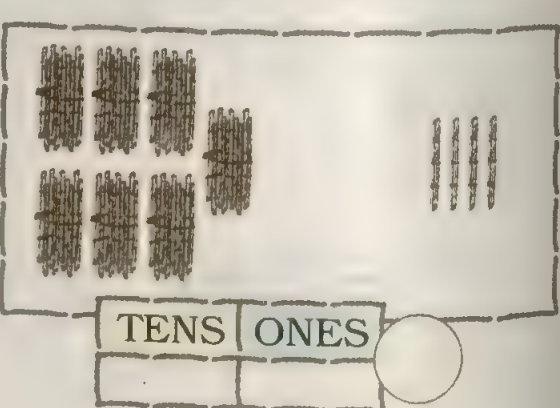
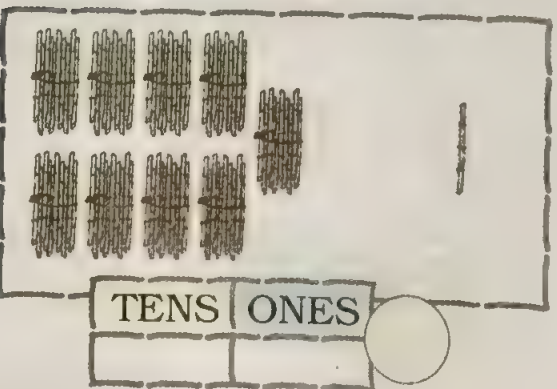
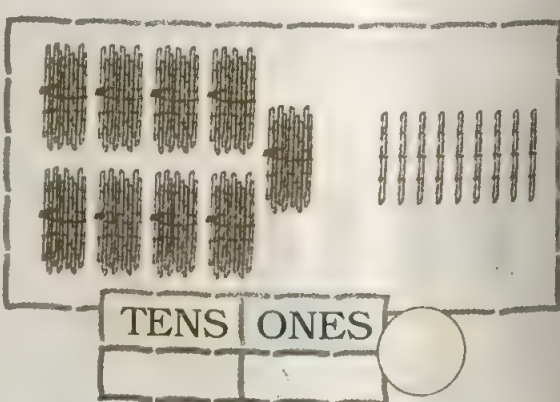
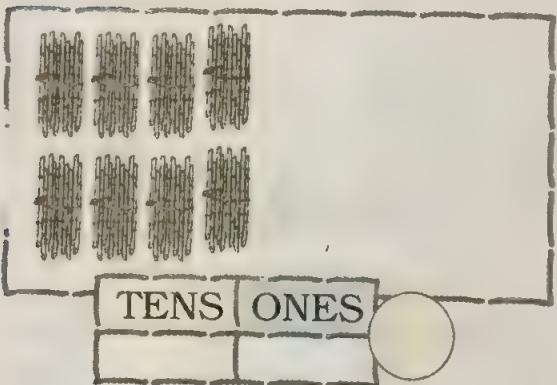
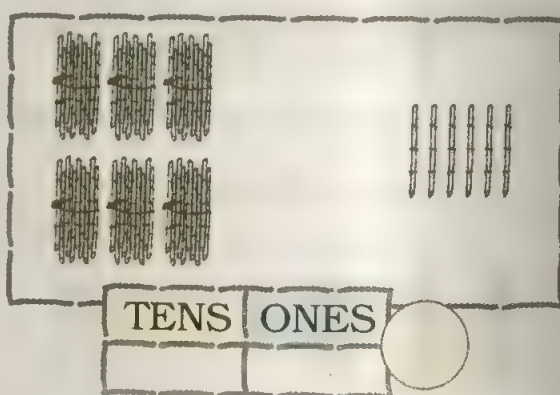
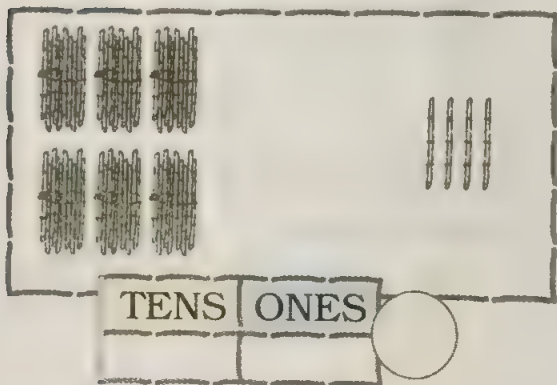
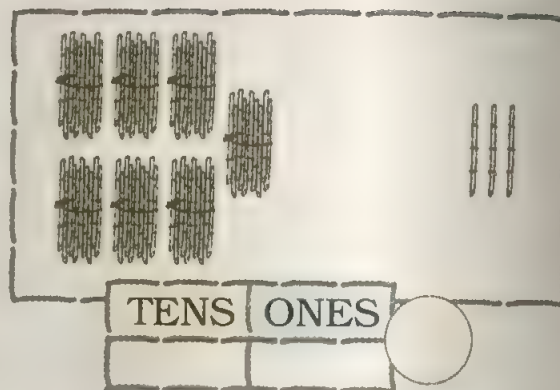
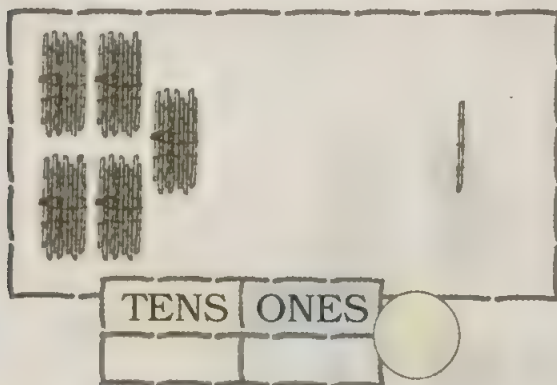
Write the number.



Draw the bundles and ones of the number.



Write the number in the given space.







# Numbers from 51 to 70

Fill in the blanks.

51

5 TENS 1 ONE

52

5 TENS 2 ONES

53

5 TENS 3 ONES

54

5 TENS 4 ONES

55

5 TENS 5 ONES

56

5 TENS 6 ONES

57

5 TENS 7 ONES

58

5 TENS 8 ONES

59

5 TENS 9 ONES

60

5 TENS 1 TEN

61

6 TENS 1 ONE

62

6 TENS 2 ONES

63

6 TENS 3 ONES

64

6 TENS 4 ONES

65

6 TENS 5 ONES

66

6 TENS 6 ONES

67

6 TENS 7 ONES

68

6 TENS 8 ONES

69

6 TENS 9 ONES

70

6 TENS 1 TEN







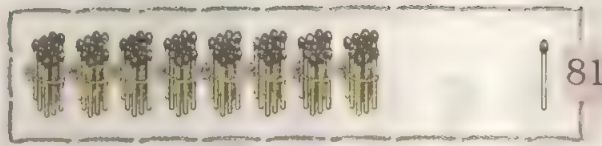
# Numbers from 71 to 90

Fill in the blanks.



7 TENS

1 ONE



8 TENS

1 ONE



7 TENS

2 ONES



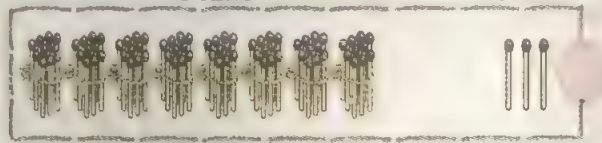
8 TENS

2 ONES



7 TENS

3 ONES



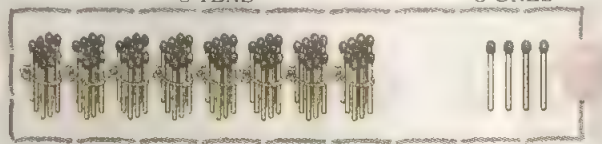
8 TENS

3 ONES



7 TENS

4 ONES



8 TENS

4 ONES



7 TENS

5 ONES



8 TENS

5 ONES



7 TENS

6 ONES



8 TENS

6 ONES



7 TENS

7 ONES



8 TENS

7 ONES



7 TENS

8 ONES



8 TENS

8 ONES



7 TENS

9 ONES



8 TENS

9 ONES



7 TENS

1 TEN



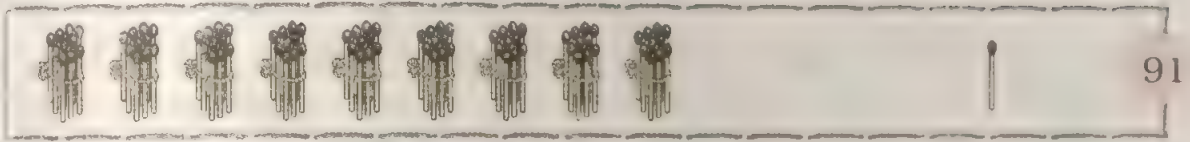
8 TENS

1 TEN



## Numbers from 91 to 100

Fill in the blanks.



9 TENS

1 ONE

91



9 TENS

2 ONES

92



9 TENS

3 ONES

93



9 TENS

4 ONES

94



9 TENS

5 ONES

95



9 TENS

6 ONES

96



9 TENS

7 ONES

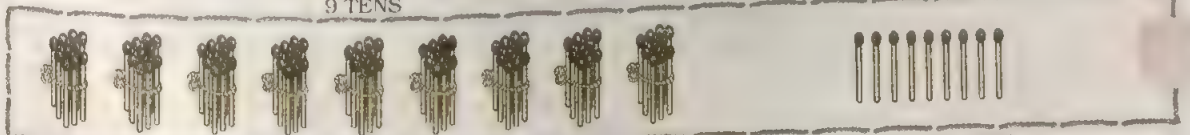
97



9 TENS

8 ONES

98



9 TENS

9 ONES

99



10 TENS

1 TEN

100





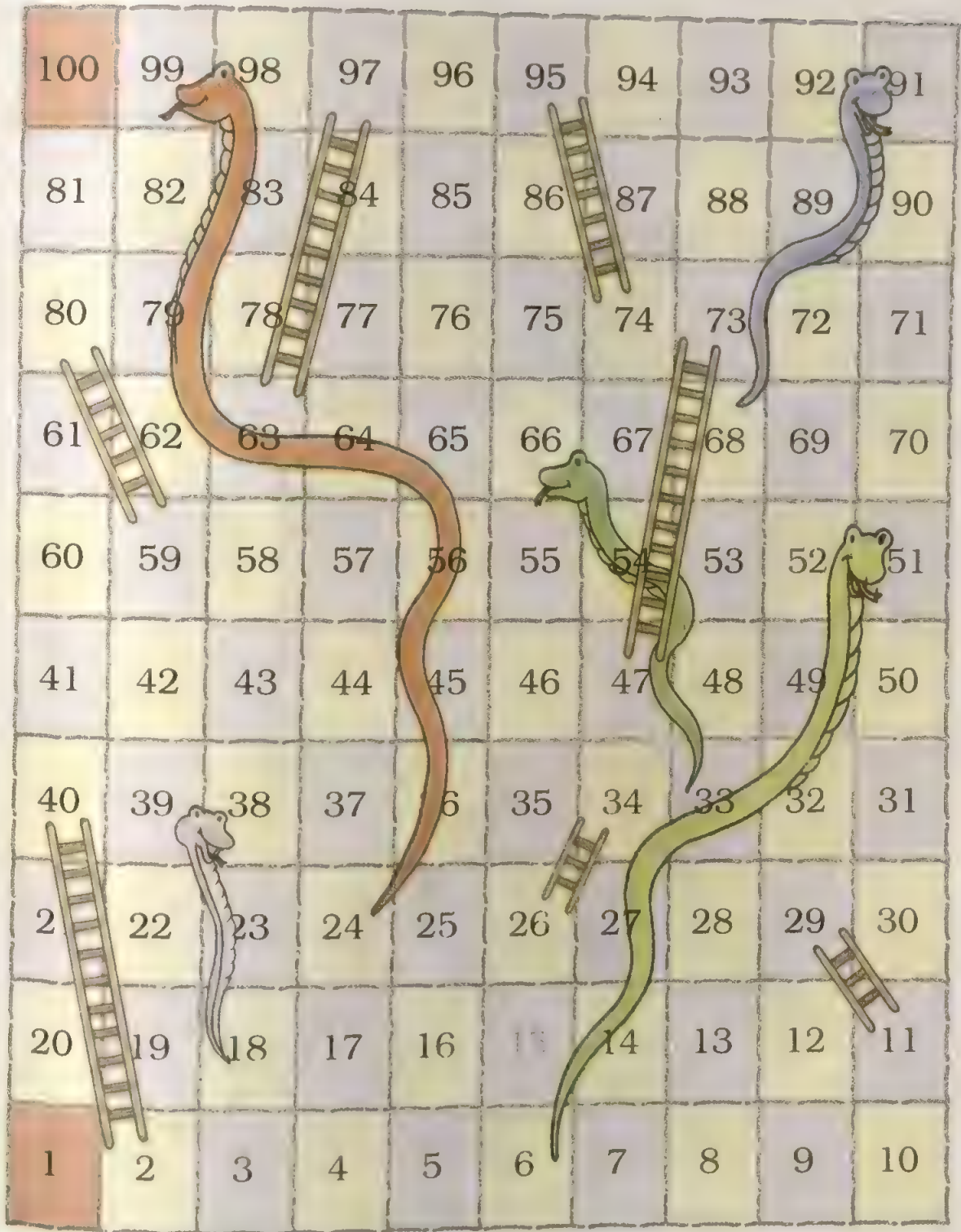
Write the missing numbers.

51	52	53	54	55	56	57	58	59	60
	62			65				69	
		73							80
			84				88		
		93		95				99	





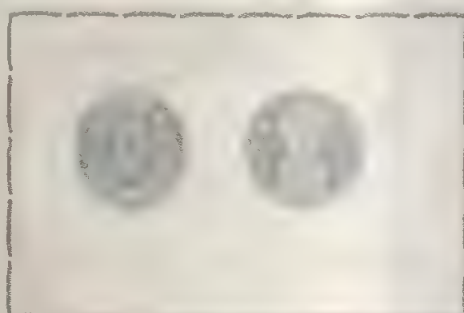
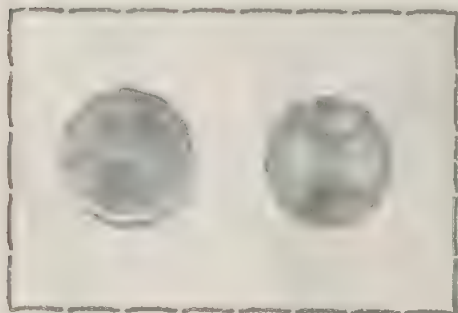
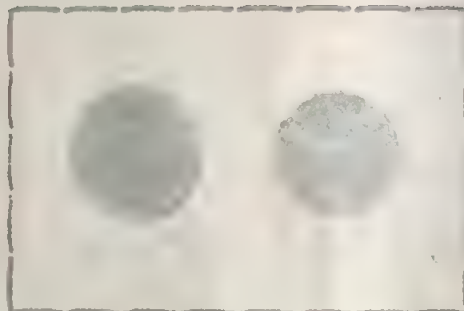
Let us play the game of snakes and ladders.



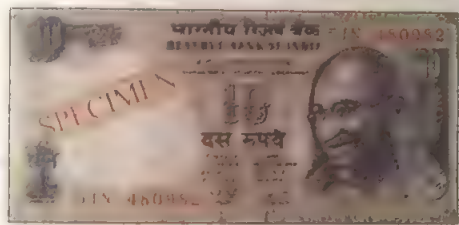


# Money

Coins currently in use in India.



Notes currently in use in our currency.





Make the given amount using different combination of coins.

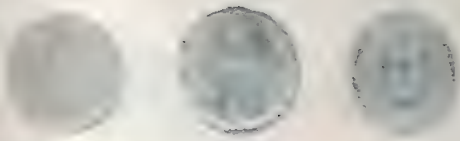
1 rupee

2 rupees

2 rupees

3 rupees

3 rupees



Make the given amount using different combination of coins.

4 rupees

4 rupees

4 rupees

5 rupees

5 rupees

5 rupees

5 rupees





Make the given amount using different combination of coins.

6 rupees

6 rupees

6 rupees

6 rupees

6 rupees

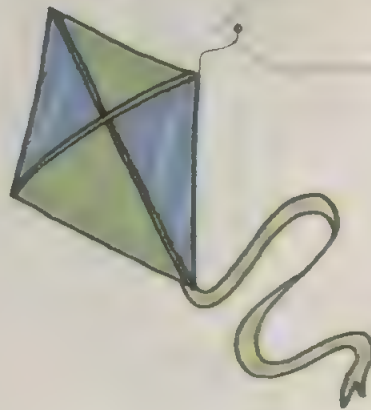
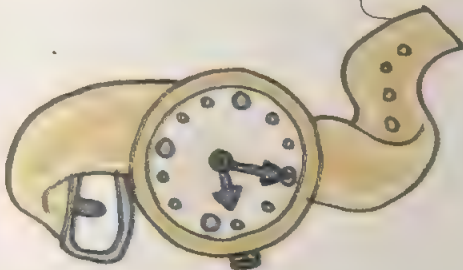
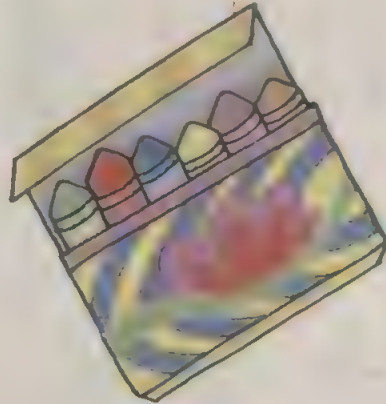
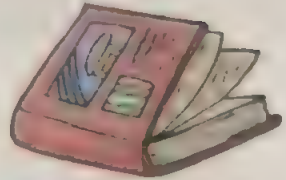
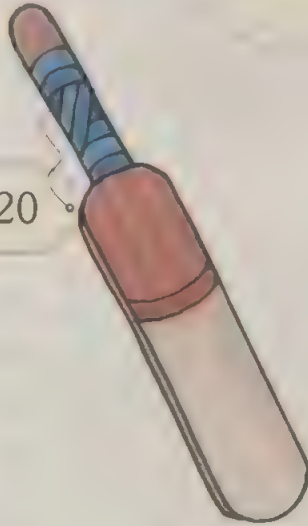




Discuss with your friend and guess the price.



Rs. 20




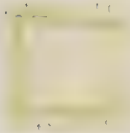



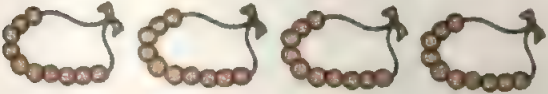
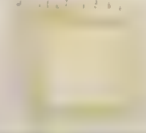
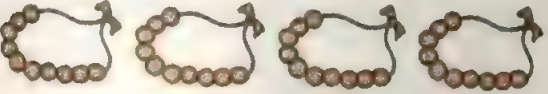

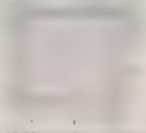




How many

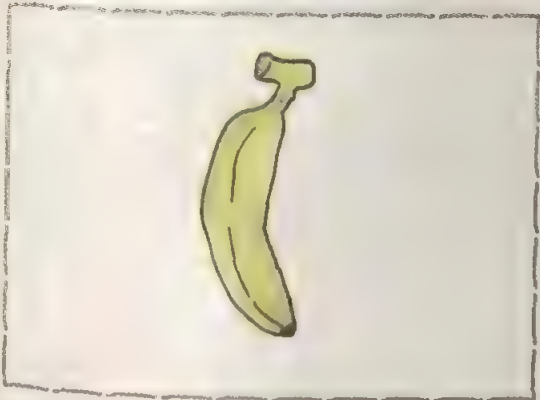
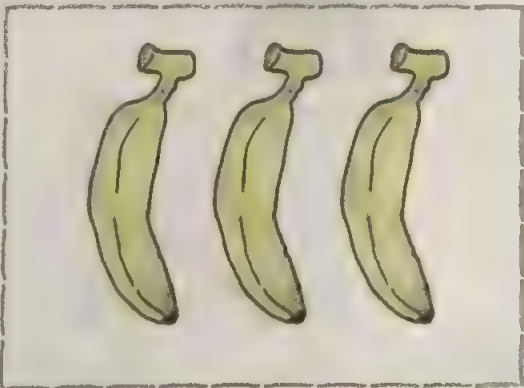
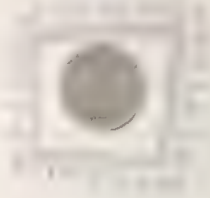

Write the number of sticks.



How many beads?

	:	
		
	:	
		
		

How much will the bananas cost?

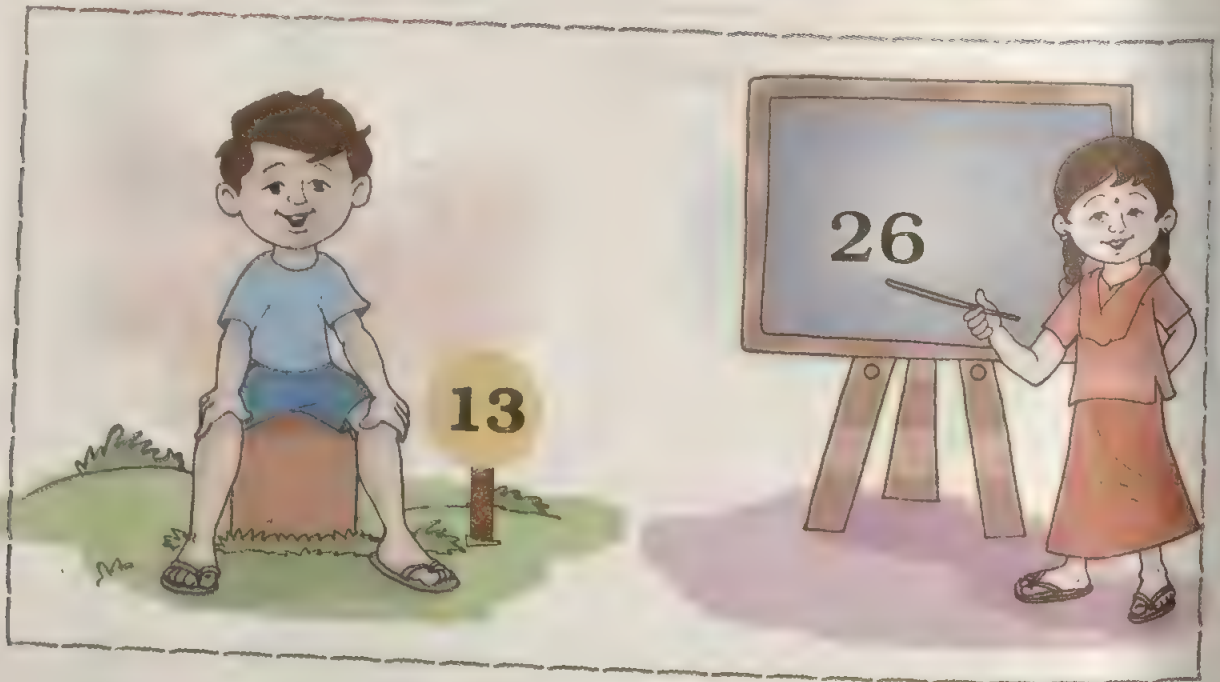




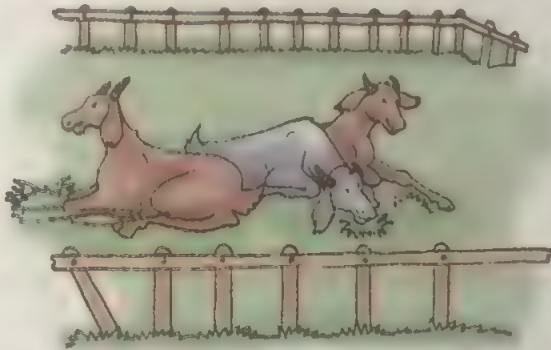
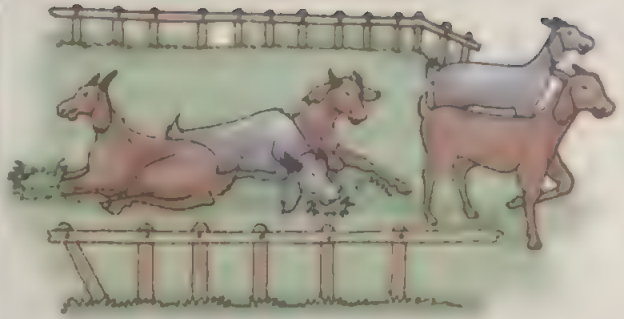
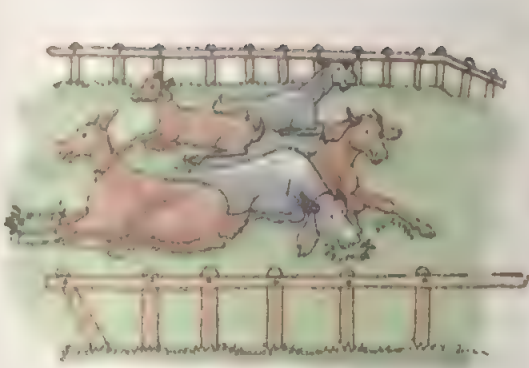
Give number name



How many tens



Which is the bigger number?



Develop a story on the pictures and narrate in the class.



Billu



### Introduction

The National Curriculum Framework (2005) quotes from the Secondary Education Commission (1952), "Citizenship in a democracy involves many intellectual, social and moral qualities...a democratic citizen should have the understanding and the intellectual integrity to sift truth from falsehood, facts from propaganda and to reject the dangerous appeal of fanaticism and prejudice ... should neither reject the old because it is old nor accept the new because it is new, but dispassionately examine both and courageously reject what arrests the forces of justice and progress....". The quote reaffirms the commitment of our education system to democracy and reiterates that citizens in a democracy should be able to think for themselves and be able to sift truth from falsehood. In other words, education should necessarily help learners develop independent and critical thinking, among many other capabilities.

Mathematics perhaps is one of the best ways to develop independence of thinking, ability to examine truth and to stand by it. In mathematics we try to understand the world through shapes, numbers, quantities and logical relationships. We always experience the world, even without mathematics. But when we start noticing symmetry of shapes, become sensitive to rhythm in music, start seeing more or less in objects, etc. we are becoming mathematically keen. The discipline of knowledge build on these things— spatial forms and relationships: quantitative concepts and relationships; and abstract logical relationships, is called mathematics. The study of mathematics is expected to result in the understanding of spatial and quantitative concepts and relationships. And is expected to enhance the ability to use language in more precise manner, to use notations, and to be able to use reason in a more effective manner. Thus, directly helping future citizens in a democracy to become independent and critical thinkers.

Knowledge of the world that we live in makes up the larger part of the curriculum we pursue in order to achieve educational aims. Different subjects in the curriculum can be seen as different ways of understanding the world around us. Just as mathematics attempts to understand the world through spatial, quantitative and logical relationships, Natural Sciences could be seen as the body of knowledge about the natural world built in terms of material properties and methods through which that knowledge is created. Language can be seen as the primary ability to make sense of the world through symbols. And similarly, other curricular areas look at the world from their specific perspective. Thus, mathematics becomes one important strand in the total curricular knowledge that the child is to slowly build through experience, reflection and interaction with other people, including the teacher.

Child's experiences, ways of reflection and formation of concepts all are an integrated whole. Integrated in the psychological sense that it involves logical thinking, emotions and intentions, and physical activity, all simultaneously. Similarly it involves seeing the world in terms of spatial and quantitative relationships (mathematics), social reality as human relationships (Social Sciences), properties of substances and natural categories (Natural sciences) and its beauty, right and wrong, etc. all as a composite whole and simultaneously. All this seeing and thinking about the world becomes possible only through the use of



language. Therefore, for the child all these curricular subjects are inter-related and development in one is effected as well as effects development in all others. In teaching of any subject we need not restrict the child's experiences and thinking to any one subject area. Teaching of mathematics will be better if the teacher talks to their peers about the mathematical relationships and ideas. If children are encouraged to ask questions and voice their disagreements and confusions, they will learn better. Let the physical or other aspects of the objects be examined and discussed, and not be too narrowly focused only on the numbers and mathematical aspects alone.

The best way to teach mathematics through these books would be to first give children relevant experience, then talk about it in ordinary language to make sense of the experience, and then proceed for more formal and abstract mathematical concepts and relationships. The definition should come at the end, if at all. You will repeatedly see in these books that the children encounter some new problem first, try to solve it and in process of solving it develop new ideas. These ideas then are consolidated and formalised and become learnt mathematical concepts.

To summarise what we have discussed in the last few paragraphs:

- (a) Teaching of mathematics is directly related to achieving the important aim of helping children become independent and critical thinkers, among development of many other abilities.
- (b) Mathematics is more of a way of thinking and understanding than just numbers and shapes.
- (c) It is an integral part of the child's total experience and knowledge and therefore the relationship with the rest of the curriculum should always be kept in mind.
- (d) Children's experiences, discussions and explorations form the basis for constructing mathematical knowledge, therefore there should be ample opportunities for such activities in the classroom.
- (e) That the 'mistakes' children make are a part of their individual learning curves and steps in acquiring knowledge. The mistakes should be used to understand the child's thinking and not seen as 'problems'.
- (f) In mathematics teaching the definition should come at the end (if at all), at the consolidation stage, and not in the beginning.

A suggested general sequence of activities to use this book most profitably:

- (a) before children work on the pages of the book, introduce the relevant idea/concept through an activity/game/story/discussion;
- (b) consolidate the idea/concept through exercises for the whole class on the blackboard;
- (c) discuss the relevant page of the book, talk about pictures, what is needed to be done, about various symbols used on the page etc. then ask the children to work on the pages of the book independently;
- (d) allow discussion among the children while working on the book;
- (e) check children's work every day.
- (f) if there are 'mistakes' rather than just marking wrong or writing the 'correct' answer try to guess the child's reasons behind a given answer.
- (g) give her extra exercises/activities to start from her own understanding and to lead to the mathematical thinking you want her to achieve.

*Teacher's notes for Chapters 1-7, 9-10 and 12 have been given in detail. Since, Chapters 8, 11 and 13 do not need special instruction, teachers may use similar activities for instruction in the class as given for other chapters.*





The world we experience around us would be a huge blur of colour and sight if we do not automatically organise it into shapes and spatial relationships. It is because of this interpretation in shapes and spatial relationships that we see it as built by different objects and having distinguishable features. The ability to interpret the experience in this manner is called spatial understanding. Children who develop a strong sense of spatial relationships are better prepared to learn numbers and measurement data as well as for abstract mathematical thinking. Hence, development of these concepts to appropriate level should be paid adequate attention from the early stages. That is the aim of the first chapter in this book.

A good teacher can develop her/his own ways to use any book. That is true for this book as well. One way of using it effectively is outlined below. Many of the suggestions for this chapter are of general nature and would be equally applicable to other chapters as well. We shall not repeat those general suggestions in the notes for the subsequent chapters.

### Planning and preparation

A little planning and preparation before going to the class will be of enormous help. The children and teacher will enjoy the class much more and it will also help children learn much better.

1. As part of planning, make a list of learning content of the relevant chapter. The term learning content here is being used for all the concepts, ideas, skills, principles, algorithms etc. that the chapter in question is supposed to contain. The learning content of Chapter One is given in the box below.
2. Before working on the book, organise small learning games and activities in the classroom or the playground where children can use the objects like the three dimensional shapes and get a chance to use words denoting the concepts listed in learning content of the chapter. The use of concepts could be in a request (pass me a ball bigger than this, please), in a question, or in general conversation. Once children start using these words confidently the book could be used.

### LEARNING CONTENT

Concepts: inside-outside, bigger-smaller, biggest-smallest, top-bottom, nearer-farther, nearest-farthest, above, below, on, under.

3D shapes: visual recognition of a spherical, cylindrical, cuboids and conical shapes. Ideas of rolling and sliding.

2D-shapes: visual recognition of circle, square, rectangle and triangle.

3. Chapter One can start with reading the story of the Arab and his camel. When reading the story ask the children to look at the pictures and make an attempt that they follow you in reading. But remember that its you who are reading and children are just following or guessing; do not expect them to read independently. After reading, talk about inside-outside. Create more situations where these words are used.
4. For pages 3 to 7 create a context, do similar exercises on the blackboard, and then let children work on their books. Allow children to discuss with each other. Encourage talking.



5. Pages 8 and 9 are for conversation. Ask children to open, say, page 8 and then draw their attention to various things and people in the picture. How many children are on tables? How many under the table? Are there any children on the stool? And so on. Then let children ask such questions. It would be great fun to create a situation as shown in the picture on page 8 in your classroom with half the children and talk with the other half about them using all the relevant concepts.
6. When teaching about three dimensional shapes, collect locally available objects of different shapes like matchsticks, beads, marbles, bottles, caps, buttons, empty match boxes, funnel, bangles etc. The children must be encouraged to sort out the objects in any way they choose. Through careful discussion with them every child should be encouraged to explain what she or he has done and why. Questions like—  
 Why do these objects go together?  
 Why does this object belong to this group?  
 Can you sort the objects in a different way? etc. may be asked.
7. From the collection made for the previous activity, place the ball or a marble on an inclined surface and ask the students to observe how it moves down the surface. Ask the students to sort the objects on the basis of their movement on an inclined surface and ask them to name some more of such objects which will roll or slide.
8. Blindfold one of the students, give her/him one of the objects. Ask to touch and feel it and then guess whether it will roll or slide.
9. Read the story on pages 13 and 14 to children and talk about it. You can start a conversation about the pictures, like, what is shown? What is happening? Can also ask questions like, how did the dholak keep on rolling? How did it know the way to the lambs hut? Was the lamb steering from inside? These are not the questions to get 'correct' answers for, but simply to imagine different situations.
10. A few sheets of shapes are given at the back of the book. Ask the students to cut out each of the shapes to make a shape kit. Now ask them to use these shapes to make pictures/figures.
11. Ask the students to sort the shape in their shape kit and match similar shapes.



## Numbers from One to Nine

When children join the school they are likely to have some sort of experience with numbers and oral counting. But they may not be very confident with these numbers. Proper care should be taken to introduce the counting process systematically which builds their conceptual understanding of the number system. The basic idea behind counting is that objects of a well defined collection are matched one-to-one with an ordered set of number names. Efficient application of this idea in real situations has a few pre-requisites— matching objects of a common property, sorting and classifying objects, and ordering the relevant collection in some way. Practical activities in the classroom that involve matching, sorting, classifying, ordering concrete objects would be very useful.





For the purpose of this chapter we can say that a child knows counting if she—

- (a) Can speak the number names in correct order.
- (b) tell the correct number of objects in a given collection, i.e. can answer “how many pencils are there in my hand?”
- (c) can pick up required number of objects from a collection, i.e. “give me 7 marbles”.

Clearly, the ability to count in this sense is possible only when in addition to remembering the number sequence the child—

- (i) assigns one and only one number to each object in the process of counting
- (ii) understands that the order in which the objects are counted does not matter and
- (iii) understands that the last number named also represents the total number of objects in the collection.

To attain these abilities, the teacher may carry out the following activities:-

1. Place two collections before a child and then ask her/him to match the objects of one collection to the objects of the other collection. (The matched objects need not have any property common to them). Ask questions such as “which collection has more objects” “which has less”? “which objects do not have a partner in the other collection?”
2. Give students a collection of bottles with corresponding caps. Ask them to put a cap on each bottle. This activity can be repeated with a wide variety of other materials also. For example:-
  - (a) put a cup on each saucer.
  - (b) put a pebble on each leaf.
  - (c) put a pencil on each note book etc.

In this entire activity, the following vocabulary may be developed:  
more, less, as many as, the same number.

3. Take some beads/marbles/chalk pieces. Keep them in front of the children. Count them loudly.

one, two, three, four, .....nine.

As you count loudly, ask children to repeat the words and point distinctly to each object as you count them.

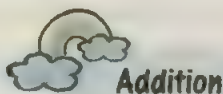
Show the children some fingers and ask them to count and then clap/jump as many times. Clap any number of times and ask the children to show those many fingers. Ask children to collect small pebbles or any other easily available safe objects and ask them to count, ask question from each other “how many are these?”, “give me five bottle caps” and so on.

4. Ask the students to count their body parts (such as eyes, nose, fingers, ears, etc.) and other objects around. For example, the objects in the class, family members, trees in the school, etc.
5. Hold some chalk pieces in one hand; keep the chalk pieces on the table one by one. As you keep them one by one on the table, make the children to count:  
“one; two; three; four; five; six; seven; eight; nine”

Remember that before the children attempt to read and write numerals 1 to 9 they should be very confident in counting up to nine.

6. The rhymes on pages 22 and 23 could be used for several activities ranging from collective recital after the teacher, to a spontaneous performance in front of the class.

7. Use number cards to introduce numerals before working on page 27. A group of 4 children could be given a set of 9 cards, each card having a numeral from one to 9 on one side and that many dots on the other. Since the children can count the number of dots, this can be used as a key in reading the numeral on the card. Children can practice reading numerals by asking each other to read and checking by counting the dots on the reverse side of the card. Work on the page only after the children are confident in reading numerals on the cards. Then allow children to use their cards as prop while working on pages 27 to 33.
8. To introduce "zero", collect some objects, up to five in number, on your table. Ask children to tell how many are they. Then remove one, saying "one goes out" or something similar, and ask "how many left?" When the last object is removed some child in the class may say "zero", most are likely to say "nothing". You can introduce the idea of zero as a number here, that signifies nothing in a collection. For example, saying "zero pen on the table". Let children do this activity in small groups. Once the children get the idea of zero, you can introduce another card in their set with zero on one side and blank on the reverse.



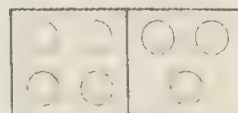
Addition is essentially the concept of putting (combining) collections together where attention is focused on the number of objects in the collection. Before we take up the concept, let children get sufficient exposure and experience of combining collections. Children may be provided enough opportunities to handle a wide variety of concrete materials. 'One more' idea may be initially introduced and then often recalled.

For the development of the concept, there are three stages—

1. Objects of each collection are counted, the collections are combined and the objects of the resulting collection are counted.
2. Objects of the first collection are counted. Objects of the second collection are counted beyond the number of objects of the first collection and so on.
3. Objects of collections are not used. Instead, the numbers of objects of the collections are used.

### Activities

1. Collect some objects like leaves, pebbles seeds etc. Keep them in two different groups and ask a child to tell how many objects are there altogether in the two groups.
2. Take two cards having pictures of different number of objects (of the same kind). Ask the students to tell how many objects are there altogether.
3. Ask a child to come to the blackboard and draw three triangles. Ask another child to draw two triangles. Ask the third child to tell how many triangles are drawn on the blackboard altogether.
4. Take a domino, say 4-3 domino. Ask a child to count the holes on its two parts. Ask another child to tell the total number of holes in the domino.





5. Exercises like those on page 60 have many correct answers. Try with concrete objects to make, say 5, in as many ways as one can. Then ask children to make different numbers in many ways. Write a number on the blackboard, say 7, and ask a volunteer to give one answer for it. Then ask others to give more answers, till all the answers are listed on the board.

### **Commutative Property of addition**

Help children to learn the commutative aspect of addition using concrete objects and then with the help of dominoes.

Ask questions like -

4 pencils and 2 pencils are how many pencils altogether?

2 pencils and 4 pencils are how many pencils in all?

Give many such examples, so that the child can appreciate the commutativity of addition. No need to introduce the term and ask abstract questions about commutativity, just an understanding that whether one takes 2 first and adds 4 or the other way round, the answer will remain the same.

### **Zero in Addition**

Take a container and put some objects in it. Ask the children to count the objects. Now put three objects more and ask the children to say three more objects have been added. Ask them to count the objects now.

Take another container and put, say five objects in it. Do not put any more objects. Ask children to say zero objects have been added. Ask them to count the objects in the container. Help children to realise that "five and zero make five only".

At the end, the children must learn adding two numbers, without using concrete objects. Speak out slowly any two numbers, say 2 and 4. Ask a child what does 2 and 4 make. The child should say 6. If the answer is wrong, help her/him to get the right answer, using concrete objects and counting beyond one number. Continue this process with several pairs of numbers.

### **Verbal problems**

An important goal of addition is to use it in solving problems of practical utility. You will need to present problems orally to a child and ask her/him to answer. The child should use the earlier experience and maturity gained in solving the problem orally.

A few examples are given below as sample. You may ask children to work out these problems mentally. Based on it, you need to create or develop many more problems so that you can use them for providing an opportunity to learn and to evaluate, as the need may be.

Examples of problems—

1. Noori has 6 red pencils and 2 black pencils in her box. How many pencils are there in the box altogether?
3. In a garden there are 4 mango trees and 3 orange trees. How many trees are there in the garden altogether?
4. There are 2 books on a shelf. 5 more books are added on the shelf. How many books in all will be there on the shelf?
6. John has 5 toffees. His mother gave him 4 more. How many toffees in all does he have?





## Subtraction

### Three Aspects of Subtraction

There are three aspects of the concept of subtraction, all three being closely related. However, children will get this close relationship only after a lot of practical experience.

The three aspects are:-

1. Taking away: Gaurav has 5 pencils. He gave 2 pencils to his sister. How many pencils are left with him? i.e.  $5 - 2 = ?$
2. Comparison: Gaurav has 5 pencils. Akbar has 2 pencils. How many more pencils does Gaurav have than Akbar? i.e.  $5 - 2 = ?$
3. Complementary addition: Gaurav has 5 pencils. Akbar has 2 pencils. How many more must Akbar take to have the same number of pencils as Gaurav.

The idea of subtraction is essentially an idea of taking away from a collection, and the other two are interpretations of this for the purpose of problem solving. In this class, we shall restrict to only the first aspect i.e., taking away.

This concept of subtraction is encountered whenever we start with a given number of things in a collection and a part of it is taken away (removed, destroyed, eaten, blown up, lost etc.) In each case, the question being asked is "how many are left". It also includes situations where a part of a collection is identified as possessing some attribute while others don't have that attribute and the question asked is, "how many are not?" or "how many do not?". For example, Prem has 9 dogs. Out of these, 2 dogs are black. How many dogs are not black?

To introduce subtraction the teacher may take up activities as suggested.

1. Collect some objects like leaves, pebbles, seeds etc. Ask the students—how many are there. Take out some of the objects from the collection and tell the students how many you took away. Now ask them how many are left.
2. Collect balls/pencils of 2 different colours. Ask the students—how many are there? How many are red? How many are not red?
3. Take a domino. Ask the students to count all the holes on the card. Hide one of the two parts. Ask the students how many holes are there in the hidden part.
4. After the students have got sufficient experience in subtraction with concrete objects and pictures, ask them to subtract one number from the other. The next stage would be solving the problems like  $4 - 2 = ?$

### The symbolism used

The symbols used for "taken away" are substantially more difficult to understand than symbols so far in the book. They are also somewhat ambiguous. Therefore, the teacher needs to be extra careful in explaining them, particularly pages 63 and 64.

Also the idea of supplying missing number on page 68 is very difficult for five and six year olds. A lot of experience with concrete objects and talking should be given before working on this page.

### Verbal problems

Children need to learn how to connect the operation of subtraction with a range of problems using the idea of taking away (or partitioning). The key phrases such as—

take away. How many are left?, How many are not?, How many do not? etc. have to be developed.

Develop a large number of simple word problems, based on taking away (or partitioning) and present them orally one by one to the children. Children may be encouraged to answer these problems, without using concrete materials. For the guidance purpose, some problems are given below—

### Problems

1. Reena has 4 apples. She gives 2 to her friend Anju. How many apples are left with Reena?
2. Three birds are sitting on a tree. 1 bird flies away. How many birds are left on the tree?
3. Four parrots are sitting on a tree. 2 of them fly away. How many parrots are left on the tree?
4. There were 9 balloons with a girl. 3 of them burst. How many balloons are left with the girl?
5. Vedika has 18 pencils. 3 of them are red. How many pencils are not red?

5



### Numbers from 10 to 20

Children would have a substantial understanding of mathematical language, concepts, abilities and skills by the time they reach Chapter Five in this book. Some of the things they shall directly use to build their understanding of number system further are listed below—

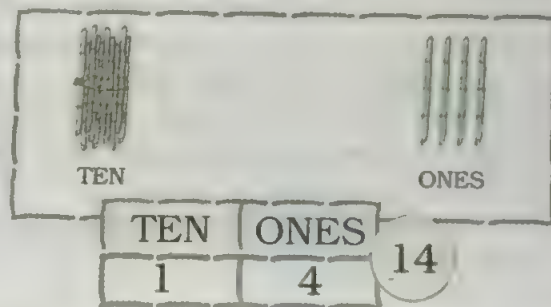
1. Can count up to nine,
2. Can read and write numerals up to nine,
3. Have experience of using number cards to learn independently and with their peers,
4. Understand "zero" as a number, can read and write the numeral for "zero".
5. Can add and subtract, both orally and in the written form.

To help children understand number system further, we must remember that reading and writing from 10 to 20 is a major development for the child. Writing of numerals becomes rule governed beginning with ten. Up to nine, children have to learn writing the numeral only by practice, there is no rule involved in writing 3, 5, or 8. Writing 10 or 17 or any number beyond ten involves a rule, or more accurately a set of rules. The number system base-10 (as we use it) is built on the idea of grouping at 10, and place of digit indicating the size of the group. This idea is fundamental to the arithmetic that the child is likely to do till upper primary. This chapter tries that the child makes a beginning in understanding important concepts of number system through a first hand experience of constructing numbers beyond ten. Therefore, notes for this chapter are a little more detailed. Preparation before starting work on the book

1. **Counting up to 20:** Through a variety of activities and practical experience and use of concrete objects teach children counting up to 20. They should be able to—
  - (a) recite number names till 20;



- (b) give X less than or equal to 20 objects out of a collection of objects; and  
 (c) tell number X is equal to 20 of objects in a given collection of objects.
- Then ask them to collect 20 small sticks, little bigger and thicker than matchsticks, say about five centimetres in length and a little thinner than a pencil. Ask all children to make one bundle of ten sticks by tying them together with a thread or by a rubber-band and keep the remaining ten sticks loose.
  - Ask children to keep their sticks in front of them. Then ask the class to give you 14 sticks without opening the bundle. Some child will definitely figure out how to do it. If no one does, you show one bundle of ten and four loose sticks. Spend some time on it, asking children to give at random 13, 16, 19, 10, 14, and so on. Soon children become very confident in giving the required number of sticks in bundles and loose sticks.
  - When children become confident in handling numbers up to 19 in the form of bundles and sticks, draw, say, one bundle and seven sticks on the board and ask children to give as many sticks and name the number. Most of the children should be able to handle it in a day or so.
  - Next step is to write the number of bundles and sticks below them and repeat the exercise in point 4 above.



- Device as many interesting activities as you can around these ideas and give a good practice to children in giving sticks, asking for a certain number of, and checking if you have received the correct number, drawing bundles and sticks on the blackboard, writing numerals on the blackboard, reading numerals from the blackboard and so on. Do not worry even if the whole process takes about 10 days, as long as you can keep the interest of the children in this activity.

#### Working in the book:

- If a teacher works on the strategy outlined above or any other well conceived strategy that covers all the concepts, there shall be no difficulty for the children in working on the pages of this book. And the teacher will have no difficulty in understanding what she should expect from the children, on each page.
- Let the children freely talk and discuss while they are working on their books, and also allow them to use the bundles and sticks to figure out exercises in the book.
- Page 70 has been given to practice making groups of 10, necessary for number system. Pages 71 and 72 give practice in making groups of 10, writing ten and ones, and writing numerals. Children shall be able to do all this.
- Pages 73 and 74 sequence the numerals that the children already know how to read and write.

You can use the same strategy in extending the number system to 50 and then to 100.





Perhaps the first practical use of time for children is to get acquainted with the sequence of daily routine that they follow. For a child, the day begins when she/he gets up. After that, a routine follows like cleaning, bathing, breakfast, going to school, recess, coming back home, rest, play, homework, helping parents in some places, watching TV, going to bed. The day ends at night when she/he goes to bed.

Children are to be familiarised with certain time-based activities that help them to understand the meaning of terms like earlier-later. Ask children to narrate their sequence of events in a day and if possible write the events on a notebook before they go to bed.

Children need to be made aware that we can keep track of how long it takes to do something.

Young children have a poor sense of the rate of time passing by. They feel that an interesting game lasts for a short time while a boring class lasts for a long-time. This misconception can be broken if they learn to keep track of the duration.

To start with, the children should be able to, see or hear the small intervals of time passing by. For this purpose you can make a simple time measuring device like a pendulum by tying a small pebble or any other small stone-heavy object to the end of a string. Suspend it freely from the other end.

This pendulum can be used to keep track of duration of activities as suggested:-

1. Count the number of times the pendulum swings till you tie your shoe laces
2. Find who took longer to tie the shoelaces.
3. Count the swings it takes you to draw a house, walking across a playground, running across the same play ground, etc.



### (a) LENGTH

#### Comparison of Two Objects

To start with, two rods which are clearly different in length must be chosen. Pointing out to these rods, questions such as which rod is longer/shorter may be asked. Similarly, we may take two pencils and ask them which pencil is longer/shorter?

With the help of several such examples, we should draw out the two aspects in any comparison. For example, children must learn that if the blue pencil is longer than the red one, it follows that the red pencil is shorter than the blue one.

You may ask children:

- Find objects longer than this pen.
- Find objects shorter than this stick.
- In the class, who all are taller than you?
- In the class, who all are shorter than you?

In this manner, the following vocabulary must be introduced to the children—

Longer – Shorter  
Taller – Shorter

Thinner – Thicker  
Thick – Thicker

## Conservation Experience

At the end, children must be given conservation experience i.e., equivalence. The words such as “as long as; as tall as; as thick as; etc.” must be introduced to children through experiences.



Which slab is longer?  
Are both of the same length?  
Is each slab as long as the other?



Which slab is longer?  
Are both of the same length?

## Ordering objects according to length

When three or more objects of varying length, width or height are given, the same can be arranged in the order of size by inspection, and checked by direct comparison, in case, the difference is obvious. At this stage, introduce to children the superlative forms—longest, shortest, tallest, thickest, thinnest, etc.

## (b) WEIGHT

### Comparison of Two Objects

Before children can start measuring weights of objects, they must have some idea of heavy, light, heavier, lighter and so on.

In the beginning, take two objects, where one is much heavier than the other. For example, a watermelon and a lemon; a book and a pen.

### Comparison by Direct Handling

Place before children objects of similar volume, differing in weight only. Give them the basic vocabulary.

- The red box is heavy.
- The green box is light.
- The red box is heavier than the green box.
- The green box is lighter than the red box.

### Ordering Three or More Objects by Weight

When three or more objects of varying weight are given, the same can be arranged in order of weight by direct handling (difference in weights must be very definite). At this stage, introduce the superlative forms - heaviest and lightest.



Data Handling

Data handling is a tool to express or illustrate given information using picture symbols. For example—

Give students paper strips of different colours and ask them to write their names on the strips. Divide the class in pairs.

Ask each child to make her partner's strip equal to the length of his/her arm to measure each other's arm length. Collect all the strips.

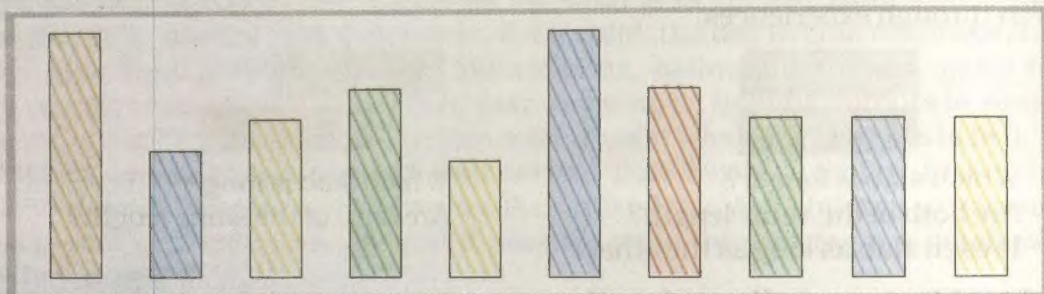
Choose a sample of ten arm-length strips at random. Compare the lengths of strips. Display the strips on the wall.



Who has the longest arm? \_\_\_\_\_

Who has the shortest arm? \_\_\_\_\_

Name the children having a particular arm length.



10



### Patterns

The study of patterns supports children in learning to observe relationships to find connections, and to make deductions, generalisations and predictions. Understanding patterns nurtures the kind of mathematical thinking that helps children become problem-solvers and thinkers. It is used as a problem-solving tool.

The teacher should start the activities by clapping in a pattern. For example:

1 - 1 - 1 \_\_\_\_\_

2 - 2 - 1 \_\_\_\_\_

1 - 2 - 3 - 1 - 2 - 3 \_\_\_\_\_ etc.

The teacher should bring a stamp pad in the class. Provide plane sheets to all the students and show them how to make impressions of a thumb on a paper. Ask them to make different patterns using thumb impressions.

The teacher can also use the shapes given at the back of the book and create different patterns from them.

12



### Money

This unit is meant to provide children experiences in dealing with collections of coins and notes.

The teacher should design or do the following suggestive activities—

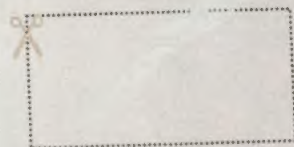
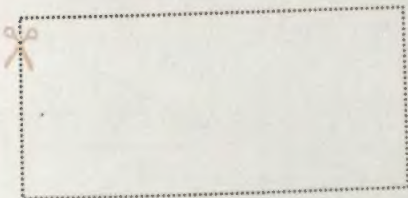
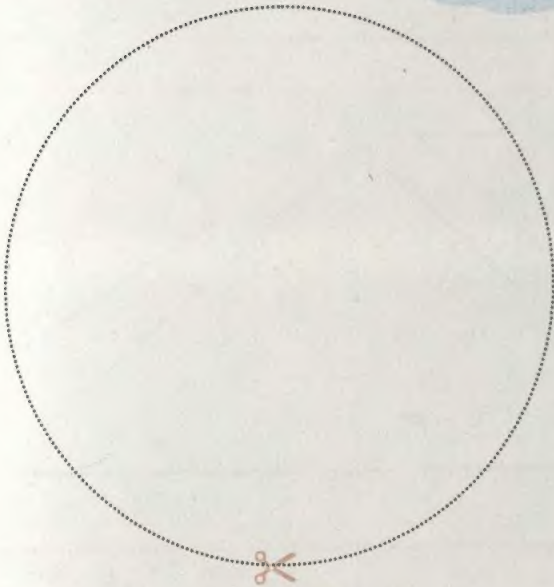
1. Introduce coins and currency notes to the children through conversation by asking them
  - (a) From where do we buy things, say, pencils, erasers, sweets etc?
  - (b) What do we give to the shopkeeper for the things we buy?
2. After you have introduced the coins and notes of different denominations, ask them to sort all the coins of say, 50 paise from a given collection of coins and so on.
3. Bring an empty pack of toothpaste, wrapper of soap etc. Ask the students to read the price tag on the pack and pick up a coin or note from the collection of coins/notes for which the said object can be bought.
4. Give them some coins/notes of same/different denominations and ask them to find the total value of the collection.
5. Ask the students to make a given amount by using coins/notes of different denominations.

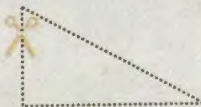
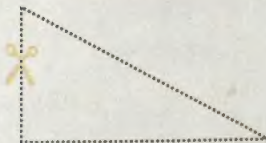
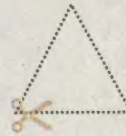
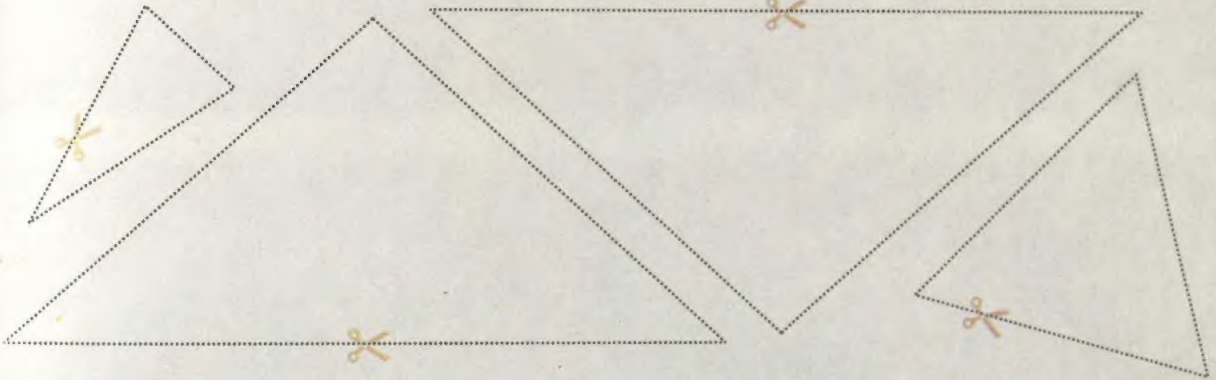
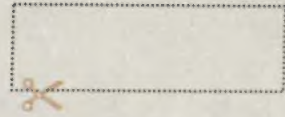
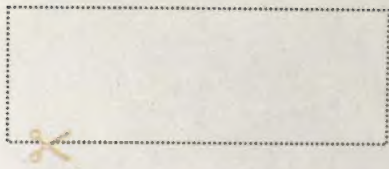




# The Shape kit

S.C.E.R.T. W.B.  
NCE 005









0119



राष्ट्रीय शैक्षिक अनुसंधान और प्रशिक्षण परिषद्  
NATIONAL COUNCIL OF EDUCATIONAL RESEARCH AND TRAINING

ISBN 81-7450-476-1